The Harman Kardon Model hk 400xm

Stereo Cassette Deck

Technical Manual

harman/kardon

PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors.
2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.
3. Replacement for output and driver transistors, if necessary, must be made from the same beta group as the original type.
4. If one output transistor burns out (open or short) always remove all the output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohmmeter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.
5. When mounting a replacement power transistor, be sure that the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistor failure.
6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.
7. Fuses must be replaced with size and type indicated. Use of other types can expose components to destructive current levels.

ALIGNMENT PROCEDURES

MECHANICAL ADJUSTMENTS

RECORD/PLAYBACK HEAD ADJUSTMENT

1. Set the head gauge (M-300) to the cassette compartment.
2. Depress playback button and, adjusting the hexagon screws (A) and (B) to the same direction and turns, set the head so as the adjustment chip attached to the gauge not to touch the tape guide of the head as shown in Fig. 1.
3. Set the unit at auto search position and adjust the head base bracket so as the top end of the adjustment chip (MAZ-0181(B)) comes to between 0 and MAX on the head gauge as shown in Fig. 2 by loosening and refastening the screws (C) and (D).
4. Depress playback button and adjust the head by shifting the shaded part of head slider to the directions as shown in Fig. 3 so as the top end of the attached adjustment chip comes to between MIN! and 0 on the head gauge as shown in Fig. 2.
5. Follow the head azimuth adjustment.

ERASE HEAD ADJUSTMENT

1. Set the head gauge to the cassette compartment.
2. Depress playback button and adjust the head hight with special washer under the head so as the adjustment chip attached to the head gauge not to touch the tape guide as shown in Fig. 1.
3. Depress playback button and set the head to the position where the attached adjustment chip comes to between MIN and 0 on the head gauge as shown in Fig. 2 by adjusting with screws (E) and (F).

PINCH ROLLER TENSION ADJUSTMENT

1. Make sure that the clearance between the pinch roller and the lever is 0.3mm when unit is in the play mode. If not, bend the lever adjustment point (A) in the arrow direction as shown in Fig. 4 to adjust the clearance.
2. Bend the lever adjustment point (B) in the arrow directions as shown in Fig. 4 so that the tension by pinch roller may be 310g±40g when keeping apart pinch roller from capstan (about 0.2mm) and returning it to rotate.

ALIGNMENT PROCEDURES

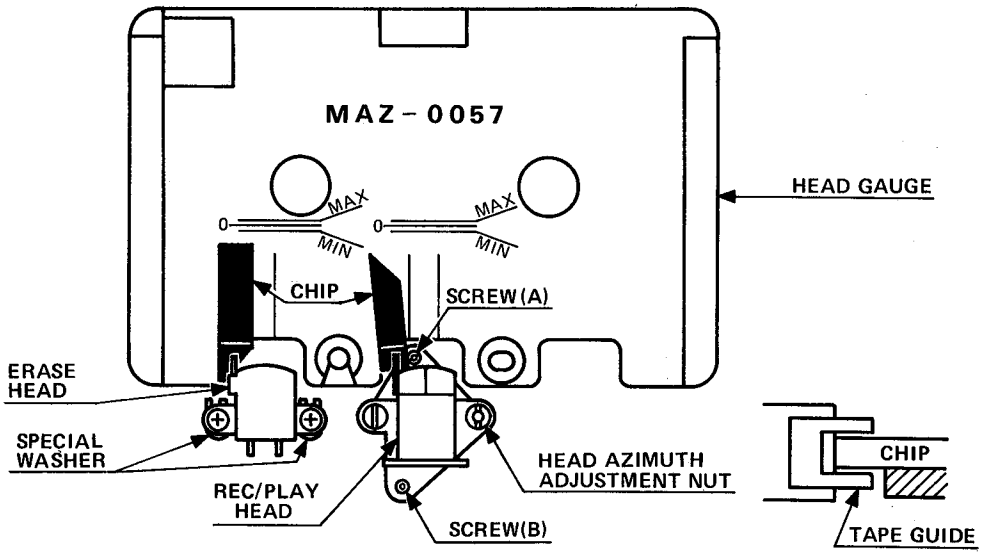


Fig. 1

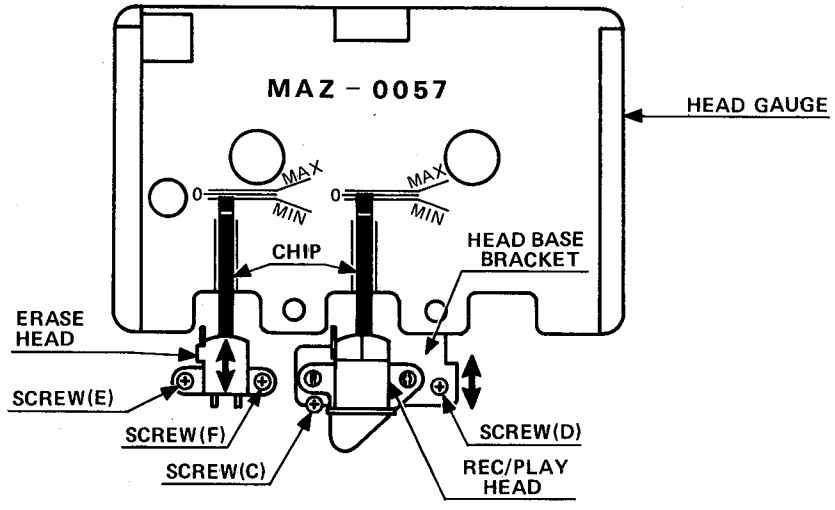


Fig. 2

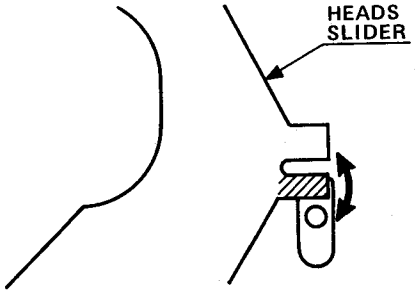


Fig. 3

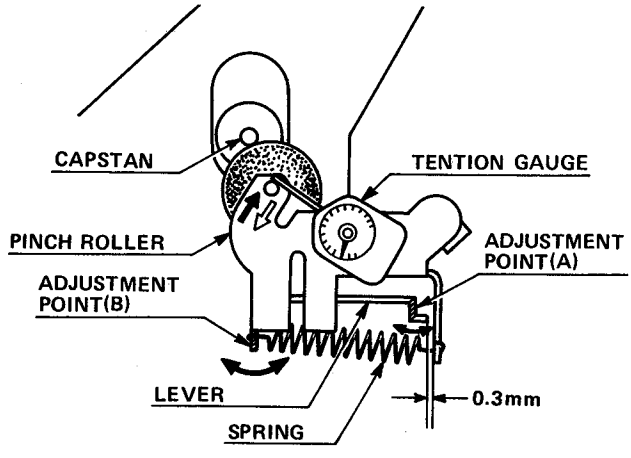


Fig. 4

ALIGNMENT PROCEDURES

ELECTRICAL ADJUSTMENTS

General Conditions (unless otherwise noted)

1. Tape Select Switches (Equalization and Bias) are LN position.
2. Dolby NR Switch is OFF position.
3. Dolby HX Switch is OFF position.
4. MPX Filter Switch is OFF position.
5. Tape Monitor Switch is SOURCE position.
6. Line Level Controls at maximum.
7. Output Level Control at maximum.
8. Fader Control at maximum.
9. Bias Fine Trim Control at center.
10. Microphone Level Controls at minimum.
11. Connect 10 k ohm (1/4W) carbon resistors across both left and right line output jacks.

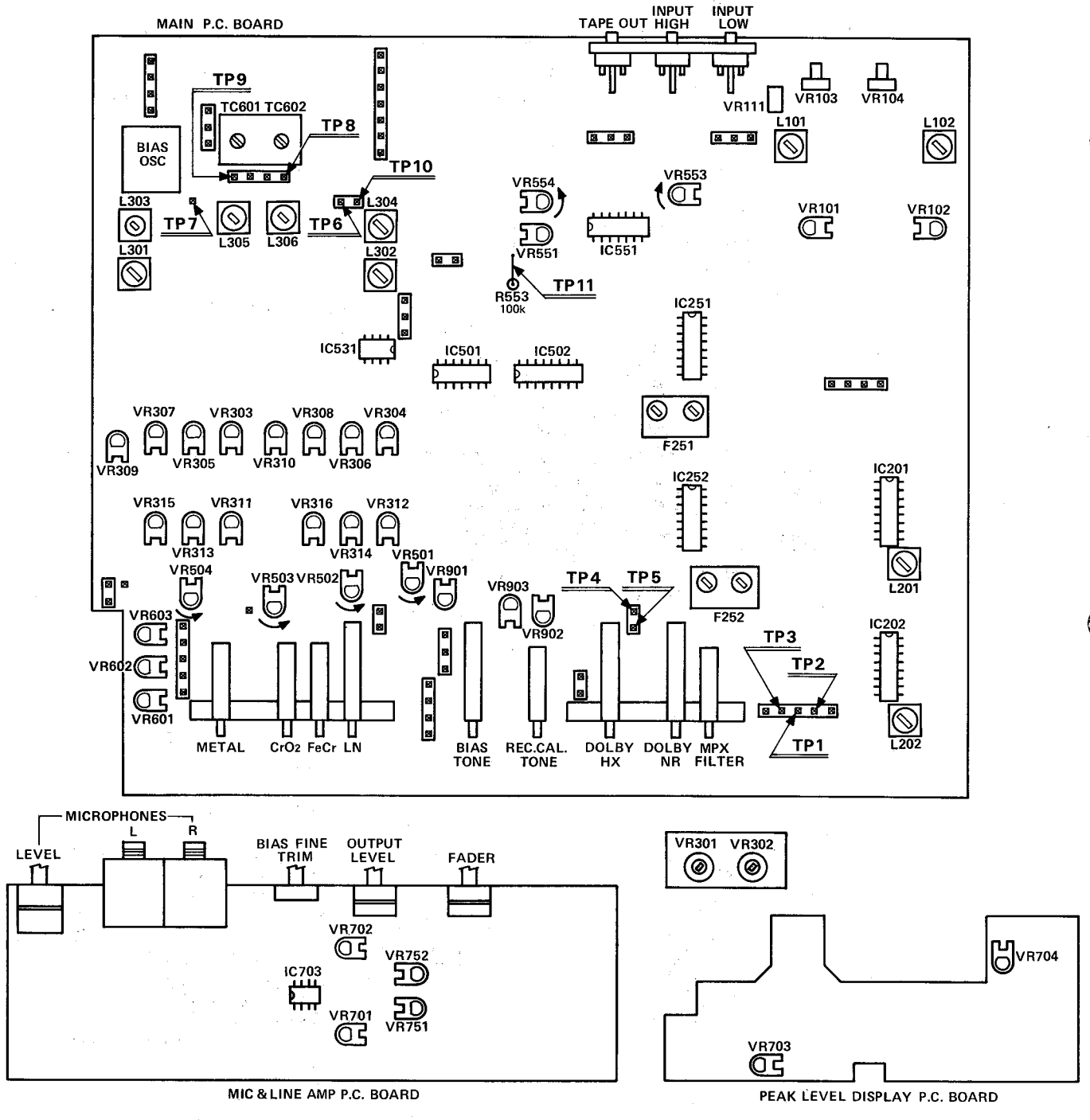


Fig. 5 — Alignment Points Location

ALIGNMENT PROCEDURES

HEAD AZIMUTH ADJUSTMENT

Equipment Required: Dual Channel AC V.T.V.M. and 10 kHz Test Tape (TEAC MTT-114)

1. Connect dual channel AC V.T.V.M. to TP3 (left), TP2 (right) and TP1 (ground).
2. Play back the "A" side of the test tape and adjust Head Azimuth Adjustment Nut so that the output indicated by the V.T.V.M. will be maximum and the difference of output between left and right becomes less than 1 dB.
3. Play back the "B" side of the test tape and adjust Head Azimuth Adjustment Nut for maximum output.
4. Repeat steps 2 and 3, and adjust Head Azimuth Adjustment Nut until the difference of outputs from side "A" and side "B" becomes less than 1 dB.

TAPE SPEED ADJUSTMENT

Equipment Required: Frequency Counter and 3 kHz Test Tape (TEAC MTT-111D)

1. Connect frequency counter to TP3 (or TP2) and TP1 (ground).
2. Play back the test tape and adjust the variable resistor built in the DC motor (MO1) for 3 kHz ±1%.

PLAYBACK AMP LEVEL ADJUSTMENT

Equipment Required: Dual Channel AC V.T.V.M. and Test Tape (TEAC MTT-150)

1. Connect dual channel AC V.T.V.M. to TP3 (left), TP2 (right) and TP1 (ground).
2. Play back the test tape and adjust VR103 (left) and VR104 (right) so that the output will be 580 mV ±0.5 dB.

PLAYBACK EQUALIZER FREQUENCY CHARACTERISTIC ADJUSTMENT

Equipment Required: Dual Channel AC V.T.V.M. and Test Tape (TEAC MTT-316)

1. Connect dual channel AC V.T.V.M. to TP3 (left), TP2 (right) and TP1 (ground).
2. Set tape select switch to FeCr position.
3. Play back the test tape and adjust VR101 (left), VR102 (right) so that the playback frequency response is within the range as shown in Fig. 6.

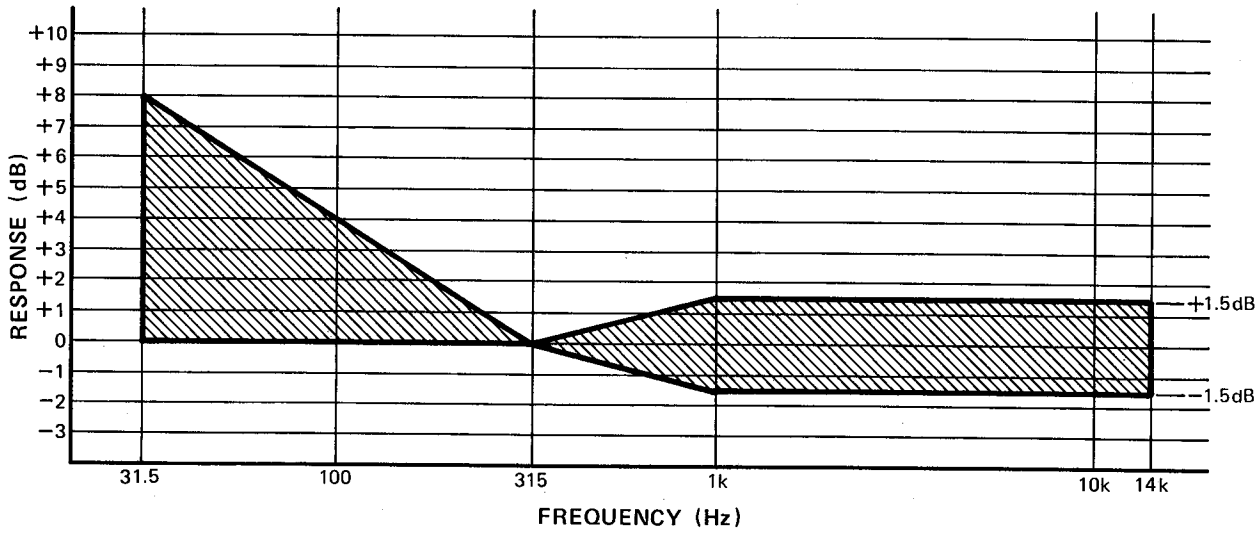


Fig. 6

Noise Reduction System and Headroom Extension System manufactured under license from Dolby Laboratories Licensing Corporation. Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

ALIGNMENT PROCEDURES

ELECTRONIC AUTO SEARCH OUTPUT LEVEL ADJUSTMENT

Equipment Required: Test Tape (TEAC MTT-250)

1. Set tape select switch to CrO_2 position.
2. Play back the test tape and adjust VR111 for obtaining the point at which auto search system operates. This point may be at maximum clockwise, center or maximum counterclockwise.

RECORD BIAS TRAP ADJUSTMENT

Equipment Required: Frequency Counter and Two AC V.T.V.M.

Note: Do not use a dual channel AC V.T.V.M. during this adjustment.

1. Set tape select switch to METAL position and Dolby HX switch to ON position.
2. Connect frequency counter and AC V.T.V.M. to TP9 and TP10 (ground).
3. Place unit in record mode.
4. Confirm that bias frequency is within the 105 kHz ±5 kHz.
5. Connect AC V.T.V.M. to TP7 (left) and TP10 (ground), and connect other AC V.T.V.M. to TP6 (right) and TP10 (ground).
6. Place unit in record mode.
7. Adjust L303, L305 (left) and L304, L306 (right) so that the output becomes minimum.
8. Connect AC V.T.V.M. to TP3 (left) and TP1 (ground), and connect other AC V.T.V.M. to TP2 (right) and TP1 (ground).
9. Place unit in record mode.
10. Adjust L101, L201 (left) and L102, L202 (right) so that the output becomes minimum.

RECORD BIAS LEVEL ADJUSTMENT

Equipment Required: Audio Signal Generator, Distortion Meter, Dual Channel AC V.T.V.M. and a Normal (TDK AC-222), FeCr (SONY CS-30), CrO_2 (TDK AC-512) and Metal (SCOTCH M-1) Blank Test Tapes

1. Connect dual channel AC V.T.V.M. and distortion meter to TP3 (left), TP2 (right) and TP1 (ground).
2. Connect audio signal generator to both left and right Low Input jacks. Set the generator for a 1 kHz signal.
3. Set tape select switch to METAL position.
4. Record the signal from generator on to a metal blank test tape, adjust Line Level controls for an output on the V.T.V.M. of 580 mV, and adjust TC601 (left) and TC602 (right) so that the distortion on the distortion meter becomes 1.1%.
5. Set tape select switch to LN position.
6. Record the signal from generator on to a normal blank test tape, adjust Line Level controls for an output on the V.T.V.M. of 580 mV, and adjust VR601 so that the distortion on the distortion meter becomes 1.3%.
7. Set tape select switch to FeCr position.
8. Record the signal from generator on to a FeCr blank test tape, adjust Line Level controls for an output on the V.T.V.M. of 580 mV, and adjust VR602 so that the distortion on the distortion meter becomes 1.9%.
9. Set tape select switch to CrO_2 position.
10. Record the signal from generator on to a CrO_2 blank test tape, adjust Line Level controls for an output on the V.T.V.M. of 580 mV, and adjust VR603 so that the distortion on the distortion meter becomes 1.4%.

RECORD/PLAYBACK LEVEL ADJUSTMENT

Equipment Required: Audio Signal Generator, Two Dual Channel AC V.T.V.M. (1 and 2) and a Normal, FeCr, CrO_2 and Metal Blank Test Tapes

1. Connect dual channel AC V.T.V.M. 1 to TP3 (left), TP2 (right) and TP1 (ground), and connect dual channel AC V.T.V.M. 2 to TP5 (left), TP4 (right) and TP1 (ground).
2. Connect audio signal generator to both left and right Low Input jacks. Set the generator for a 400 Hz signal.
3. Set tape select switch to METAL position.
4. Record the signal from generator on to a metal blank test tape, adjust Line Level controls for an output on the V.T.V.M. 2 of 580 mV −7 dB, and adjust VR301 (left) and VR302 (right) so that the output on V.T.V.M. 1 becomes 580 mV −7 dB ±1 dB.
5. Adjust VR311 (left) and VR312 (right) for LN position as it is with METAL position by using normal test tape.
6. Adjust VR313 (left) and VR314 (right) for FeCr position as it is with METAL position by using FeCr test tape.
7. Adjust VR315 (left) and VR316 (right) for CrO_2 position as it is with METAL position by using CrO_2 test tape.

ALIGNMENT PROCEDURES

RECORD/PLAYBACK EQUALIZER FREQUENCY CHARACTERISTIC ADJUSTMENT

Equipment Required: Audio Signal Generator, Two Dual Channel AC V.T.V.M. (1 and 2) and a Normal, FeCr, CrO_2 and Metal Blank Test Tapes

1. Connect dual channel AC V.T.V.M. 1 to TP3 (left), TP2 (right) and TP1 (ground), and connect dual channel AC V.T.V.M. 2 to both left and right Output jacks.
2. Connect audio signal generator to both left and right Low Input jacks.
3. Set tape monitor switch to MONITOR position and tape select switch to METAL position.
4. Set the generator for a 1 kHz signal. Adjust Line Level controls for an output on the V.T.V.M. 1 of 580 mV −25 dB, when the unit is in recording mode.
5. Record the signal from generator on to a metal blank test tape varying the generator frequency from 20 Hz to 30 kHz and note the frequency response obtained on the V.T.V.M. 2 at the same time.
6. If the above frequency response is not within shaded area of Fig. 7, adjust VR309 (left), VR310 (right), L301 (left peaking) and L302 (right peaking) until the frequency response as shown in Fig. 7 is obtained on the V.T.V.M. 2.
7. Set tape select switch to LN position.
8. Record the signal from generator on to a normal blank test tape varying the generator frequency from 20 Hz to 30 kHz and note the frequency response obtained on the V.T.V.M. 2 at the same time.
9. If the above frequency response is not within shaded area of Fig. 7, adjust VR303 (left) and VR304 (right) until the frequency response as shown in Fig. 7 is obtained on the V.T.V.M. 2.
10. Set tape select switch to FeCr position.
11. Record the signal from generator on to a FeCr blank test tape varying the generator frequency from 20 Hz to 30 kHz and note the frequency response obtained on the V.T.V.M. 2 at the same time.
12. If the above frequency response is not within shaded area of Fig. 7, adjust VR305 (left) and VR306 (right) until the frequency response as shown in Fig. 7 is obtained on the V.T.V.M. 2.
13. Set tape select switch to CrO_2 position.
14. Record the signal from generator on to a CrO_2 blank test tape varying the generator frequency from 20 Hz to 30 kHz and note the frequency response obtained on the V.T.V.M. 2 at the same time.
15. If the above frequency response is not within shaded area of Fig. 7, adjust VR307 (left) and VR308 (right) until the frequency response as shown in Fig. 7 is obtained on the V.T.V.M. 2.

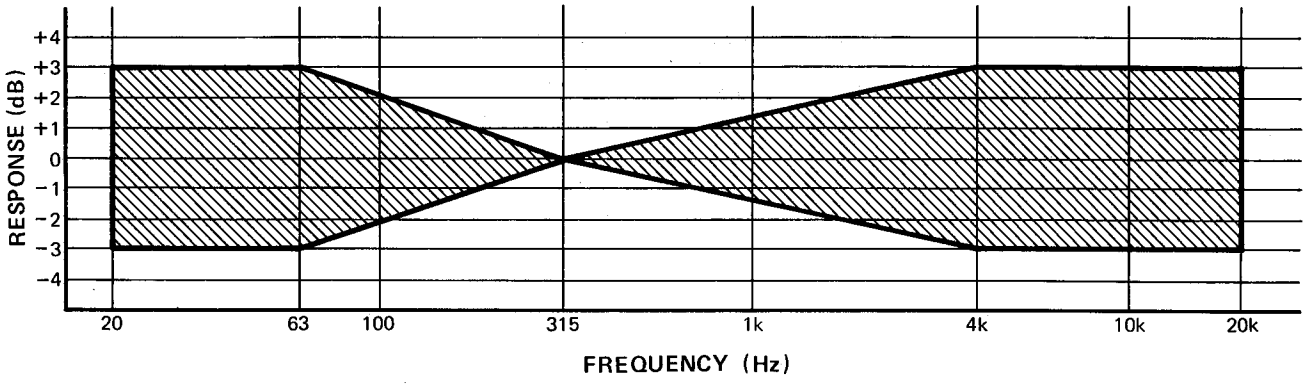


Fig. 7

BIAS TONE AND RECORD CALIBRATION TONE ADJUSTMENT

Equipment Required: Frequency Counter and Dual Channel AC V.T.V.M.

1. Connect frequency counter and dual channel AC V.T.V.M. to TP5 (left), TP4 (right) and TP1 (ground).
2. Keep bias tone switch to ON (button in) position.
3. Adjust VR901 (left) and VR902 (right) so that the output becomes 580 mV −20 dB, when frequency is within the 12.4 kHz (+1.1 kHz, −1.4 kHz) on frequency counter.
4. Keep record cal. tone switch to ON (button in) position.
5. Adjust VR903 so that the output becomes 580 mV, when frequency is within the 333 Hz (+27 Hz, −33 Hz) on frequency counter.
6. Repeat steps 3 and 5 for optimum adjustment points.

ALIGNMENT PROCEDURES

DOLBY HX BIAS LEVEL ADJUSTMENT

Equipment Required: Audio Signal Generator and Two Dual Channel AC V.T.V.M. (1 and 2)

1. Connect dual channel AC V.T.V.M. 1 to TP9 (left), TP8 (right) and TP10 (ground), and connect dual channel AC V.T.V.M. 2 to TP5 (left), TP4 (right) and TP1 (ground).
2. Connect audio signal generator to both left and right Low Input jacks. Set the generator for a 4 kHz signal. Place unit in record mode. Adjust Line Level controls for an output on the V.T.V.M. 2 of 580 mV.
3. Set Dolby HX switch to ON position.
4. Turn VR501 to maximum counterclockwise position in accordance with an arrow as shown in the Fig. 5, and keep note of the bias level on V.T.V.M. 1 at the time.
5. Adjust VR501 so that the bias level becomes −1.2 dB of level obtained at step 4 on V.T.V.M. 1.
6. Set tape select switch to FeCr position.
7. Turn VR502 to maximum counterclockwise position in accordance with an arrow as shown in the Fig. 5, and keep note of the bias level on V.T.V.M. 1 at the time.
8. Adjust VR502 so that the bias level becomes −1.5 dB of level obtained at step 7 on V.T.V.M. 1.
9. Set tape select switch to CrO_2 position.
10. Turn VR503 to maximum counterclockwise position in accordance with an arrow as shown in the Fig. 5, and keep note of the bias level on V.T.V.M. 1 at the time.
11. Adjust VR503 so that the bias level becomes −1.2 dB of level obtained at step 10 on V.T.V.M. 1.
12. Set tape select switch to METAL position.
13. Turn VR504 to maximum counterclockwise position in accordance with an arrow as shown in the Fig. 5, and keep note of the bias level on V.T.V.M. 1 at the time.
14. Adjust VR504 so that the bias level becomes −0.8 dB of level obtained at step 13 on V.T.V.M. 1.

HEADROOM SAFETY DISPLAY SENSITIVITY ADJUSTMENT

Equipment Required: Audio Signal Generator, Dual Channel AC V.T.V.M. and DC V.T.V.M.

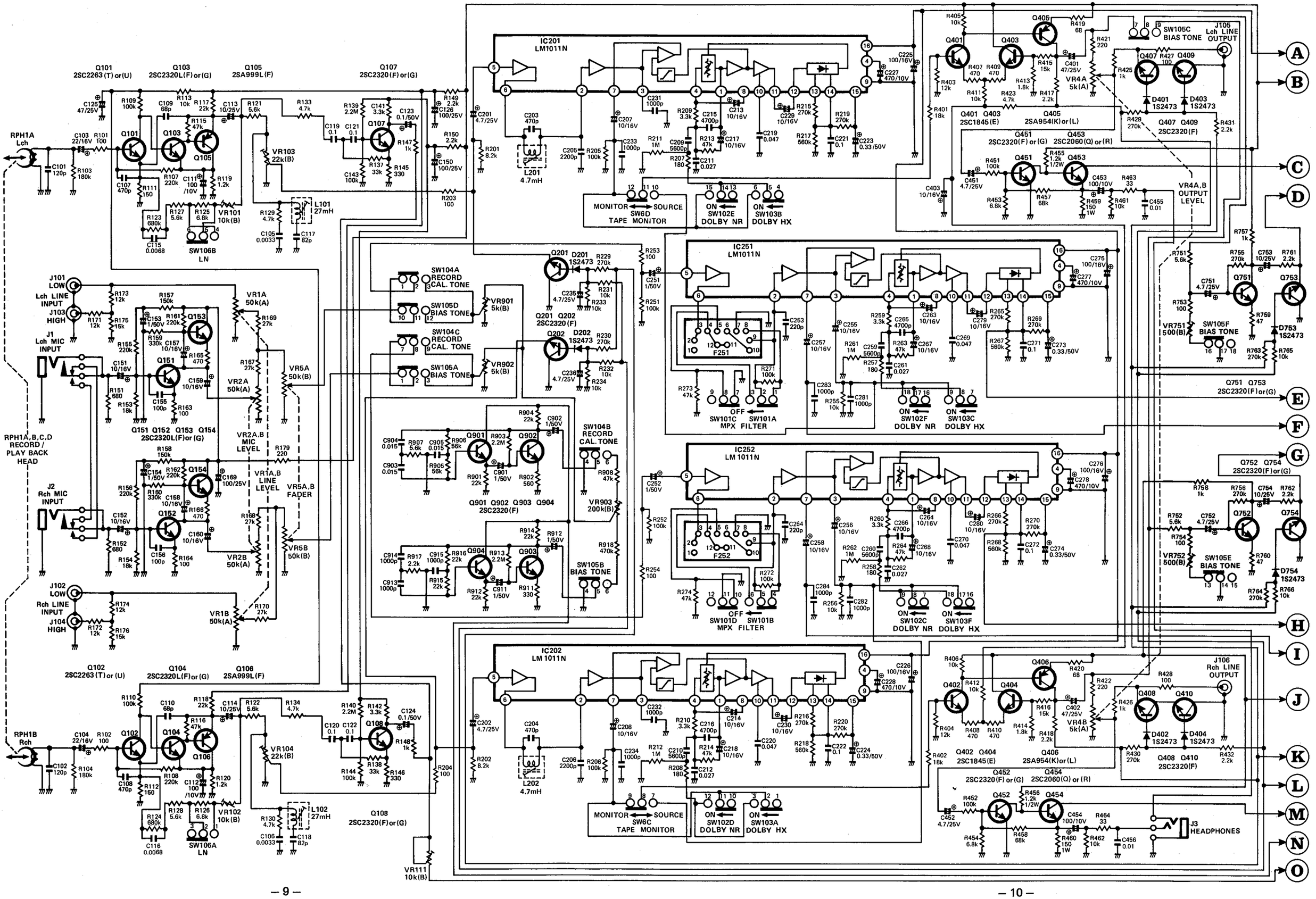
1. Set tape select switch to METAL position and Dolby HX switch to ON position.
2. Connect DC V.T.V.M. to TP11 and TP10 (ground). Place unit in record mode.
3. Adjust VR551 so that the output will be 4 V±0.1 V.
4. Confirm green LED of headroom safety is lit when VR553 is in maximum clockwise position and VR554 is in maximum counterclockwise position in accordance with an arrow as shown in the Fig. 5.
5. Connect dual channel AC V.T.V.M. to TP5 (left), TP4 (right) and TP1 (ground).
6. Connect audio signal generator to both left and right Low Input jacks. Set the generator for a 10 kHz signal. Place unit in record mode. Adjust Line Level controls for an output on the V.T.V.M. of 580 mV −10 dB.
7. Adjust VR553 so that the LED light of headroom safety changes from green to yellow.
8. Adjust Line Level controls so that the input level becomes +2 dB of input level obtained at step 6.
9. Adjust VR554 so that the LED light of headroom safety changes from yellow to red.

PEAK LEVEL DISPLAY SENSITIVITY ADJUSTMENT

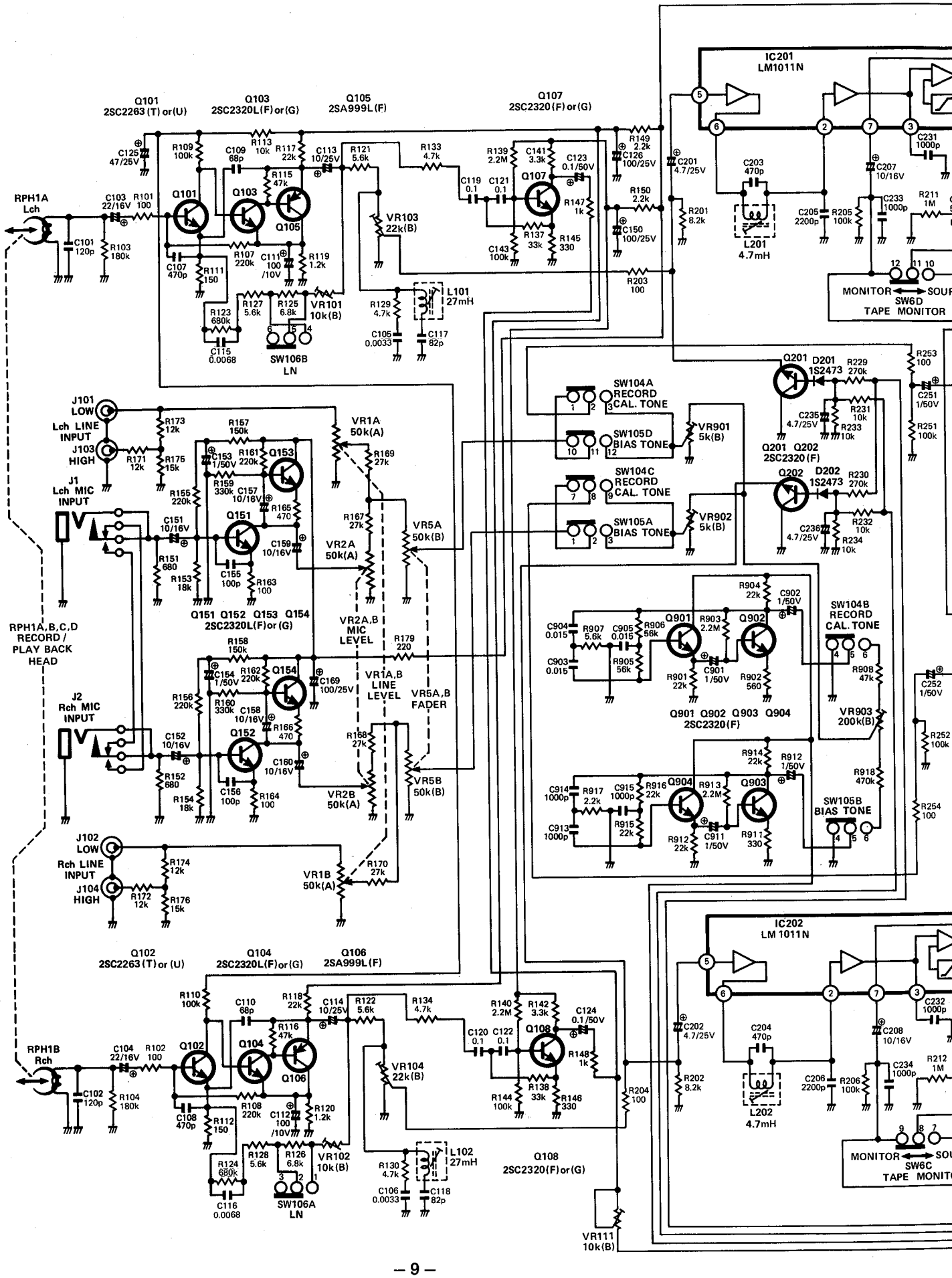
Equipment Required: Audio Signal Generator and Dual Channel AC V.T.V.M.

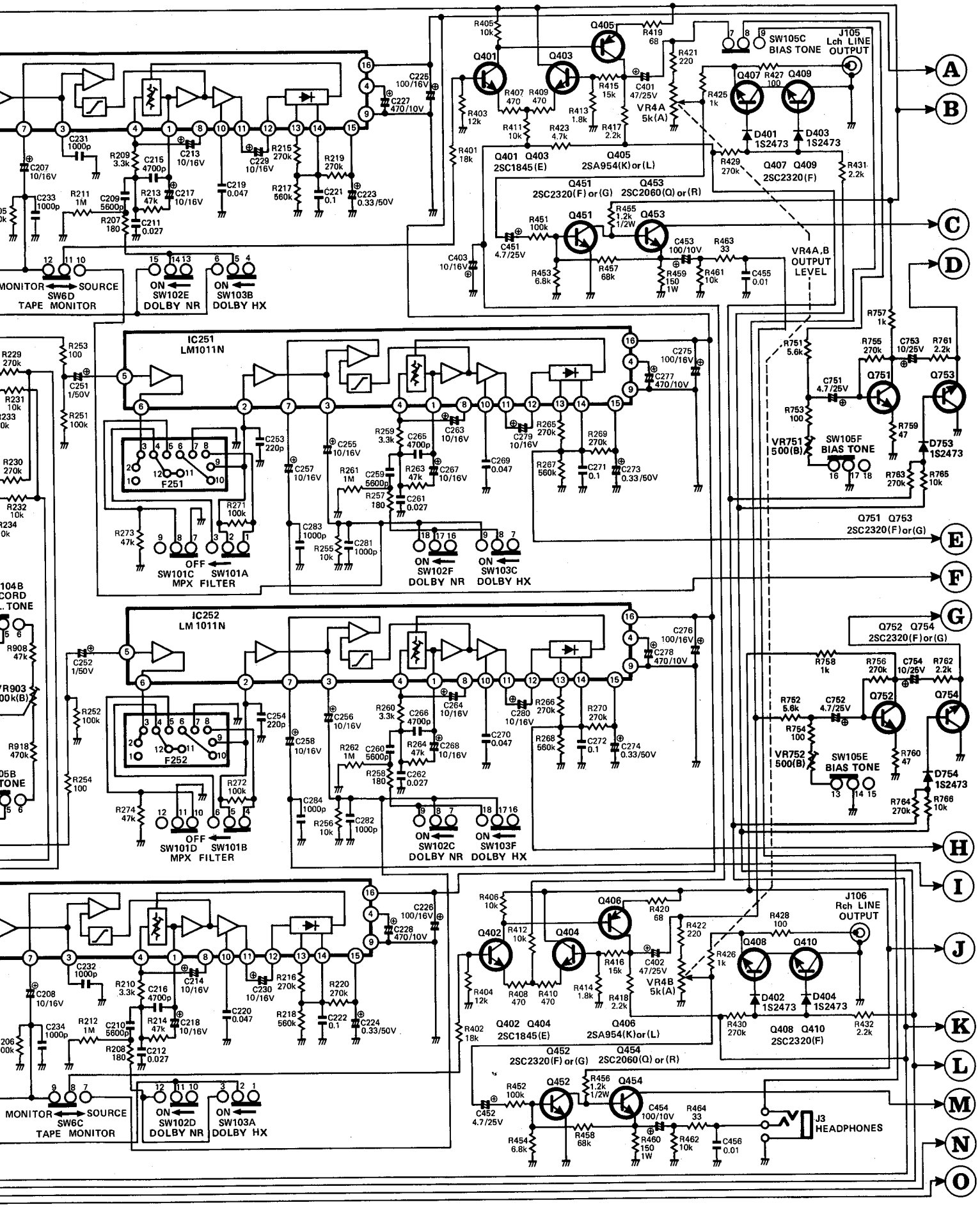
1. Connect dual channel AC V.T.V.M. to TP5 (left), TP4 (right) and TP1 (ground).
2. Connect audio signal generator to both left and right Low Input jacks. Set the generator for a 400 Hz signal. Place unit in record mode. Adjust Line Level controls for an output on the V.T.V.M. of 580 mV.
3. Keep bias tone switch to ON (button in) position.
4. Adjust VR701 (left) and VR702 (right) so that the 0 dB LEDs will light.
5. Release bias tone switch to OFF (button out) position.
6. Adjust VR751 (left) and VR752 (right) so that the 0 dB LEDs will light.
7. Adjust Line Level controls for an output on the V.T.V.M. of 580 mV −20 dB.
8. Adjust VR703 (left) and VR704 (right) so that the −20 dB LEDs will light.
9. Adjust Line Level controls for an output on the V.T.V.M. of 580 mV −21 dB.
10. Confirm −20 dB LEDs goes off.

SCHEMATIC DIAGRAM

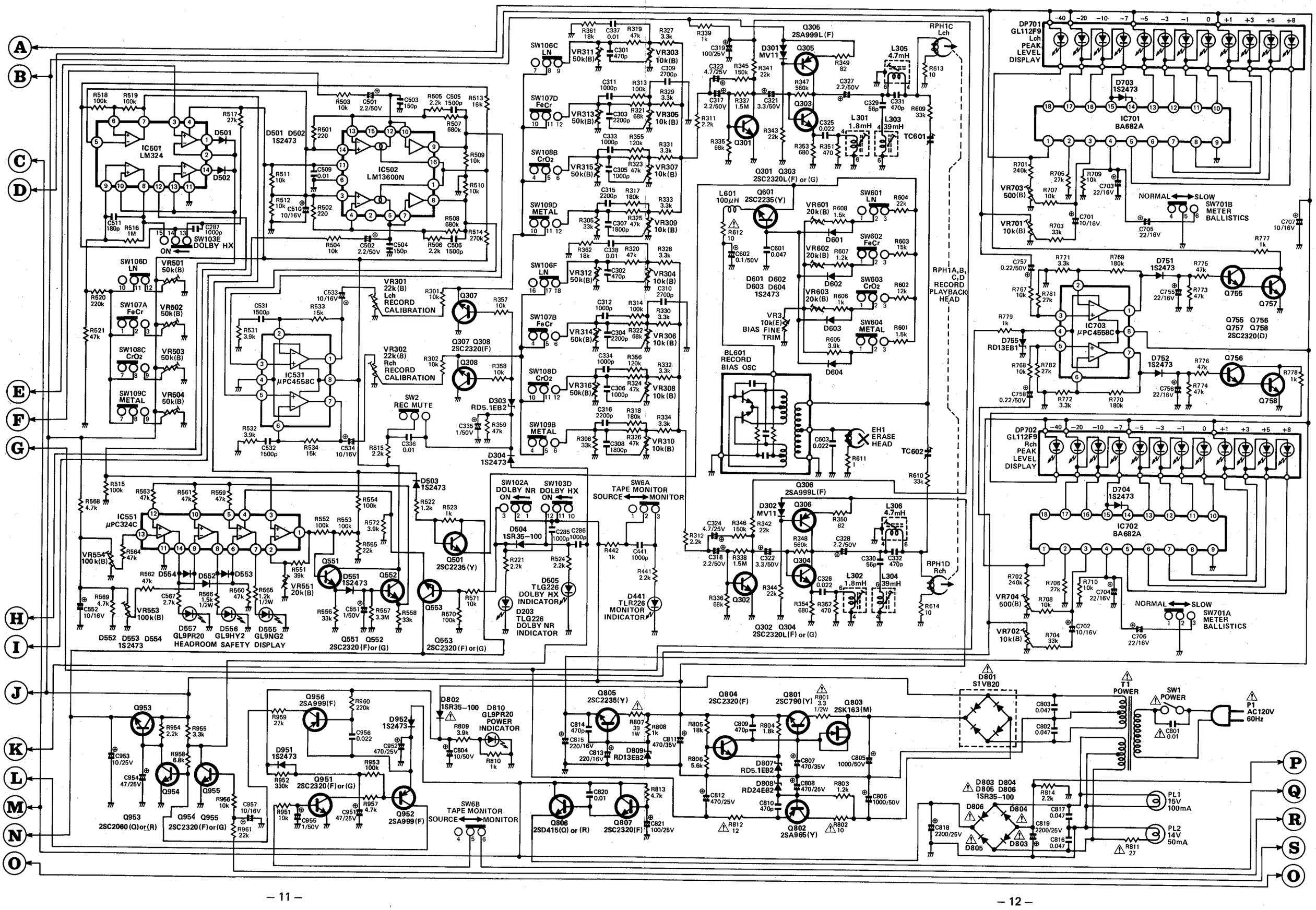


SCHEMATIC DIAGRAM

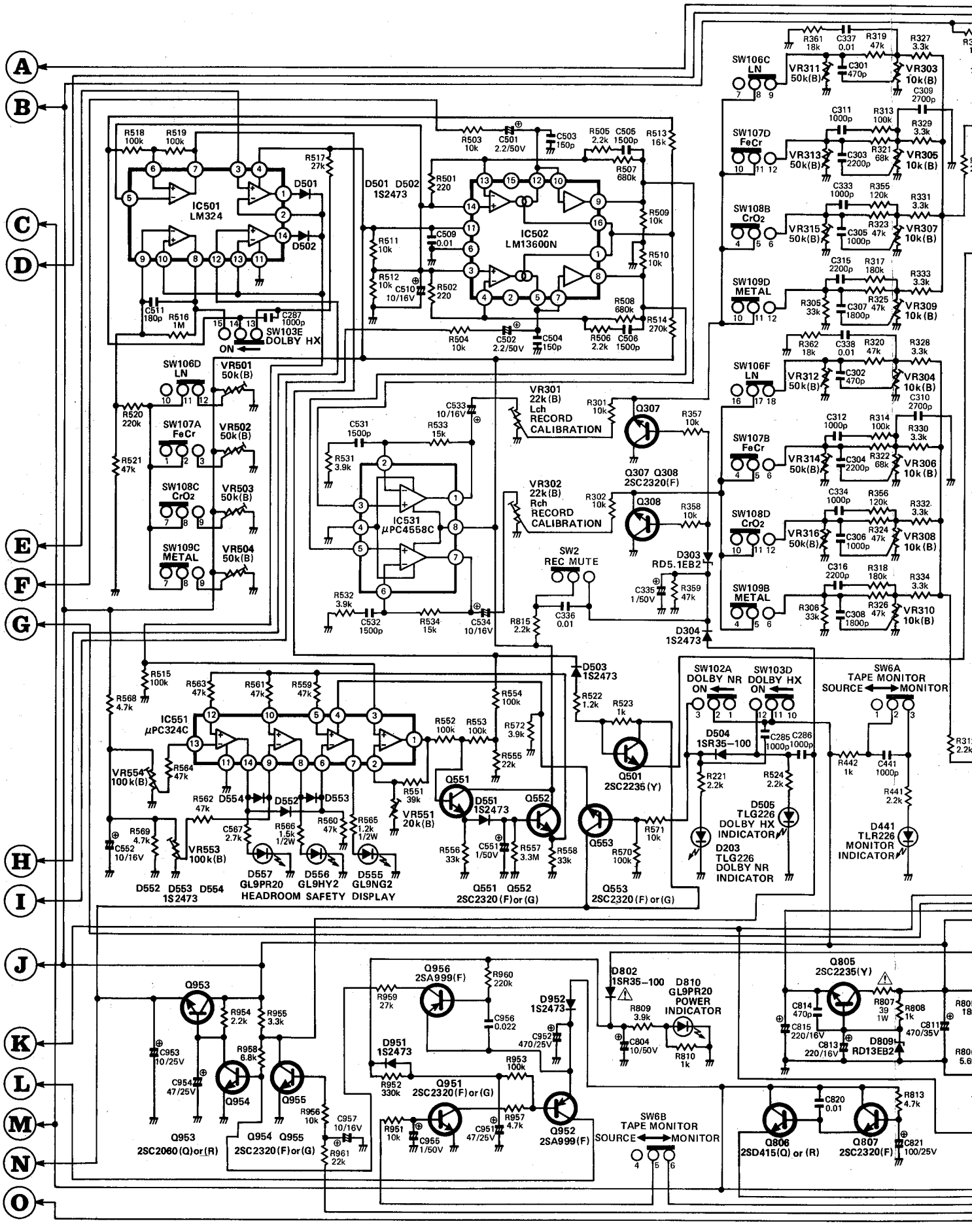


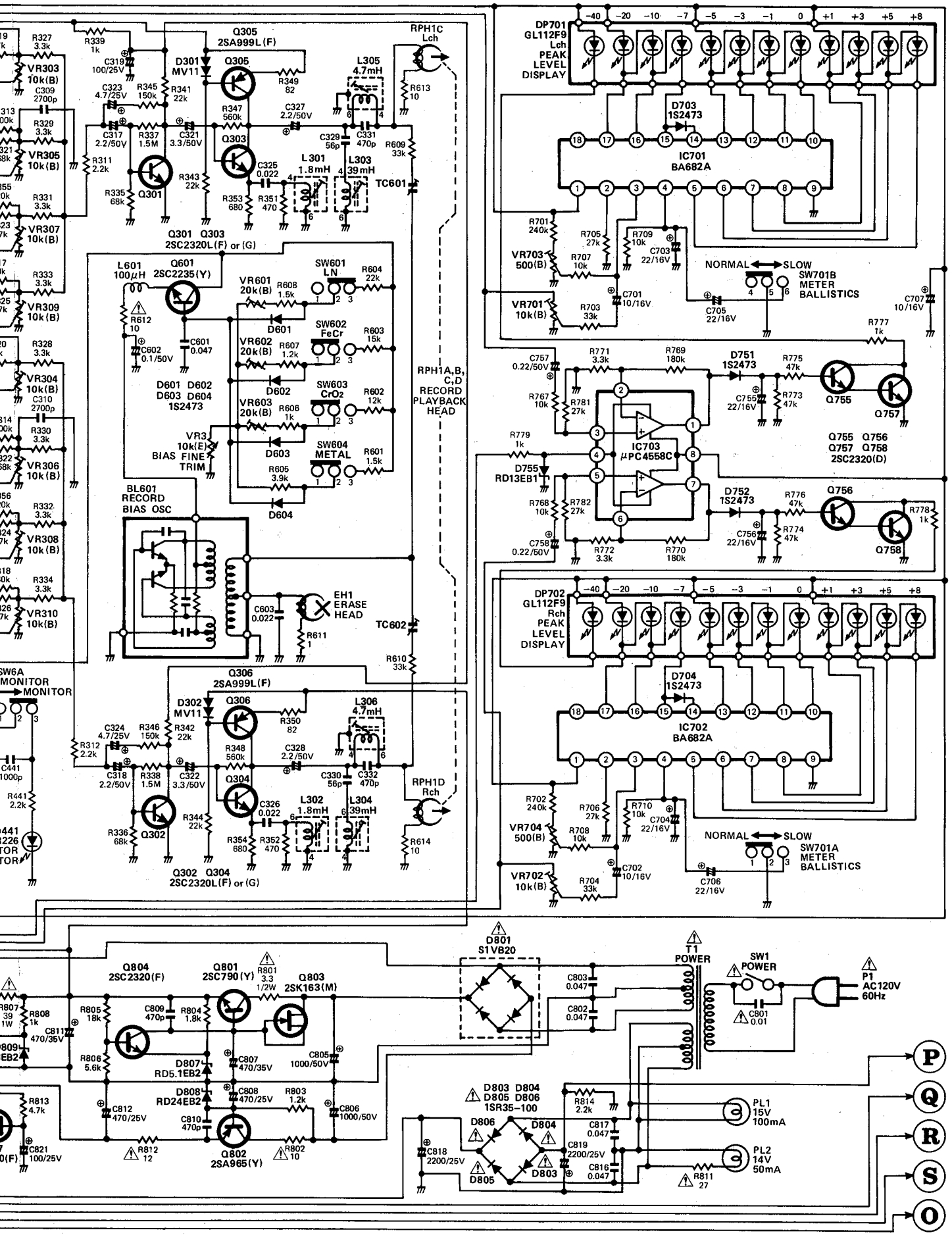

IC251
LM1011N
IC252
LM 1011N
F251
F252
SW101C
SW101A
MPX FILTER
SW101D
SW101B
MPX FILTER
SW102E
DOLBY NR
SW103B
DOLBY HX
SW102F
DOLBY NR
SW103C
DOLBY HX
SW102C
DOLBY NR
SW103F
DOLBY HX
SW102D
DOLBY NR
SW103A
DOLBY HX
SW6D
TAPE MONITOR
SW6C
TAPE MONITOR
MONITOR
SOURCE
ON
OFF
SW105C
BIAS TONE
J105
Lch LINE
OUTPUT
J106
Rch LINE
OUTPUT
SW105F
BIAS TONE
SW105E
BIAS TONE
VR4A
5k(A)
VR4B
5k(A)
VR4A,B
OUTPUT
LEVEL
VR751
500(B)
VR752
500(B)
Q401 Q403
2SC1845(E)
Q405
2SA954(K) or (L)
Q407 Q409
2SC2320(F)
Q451 Q453
2SC2320(F) or (G) 2SC2060(Q) or (R)
Q751 Q753
2SC2320(F) or (G)
Q752 Q754
2SC2320(F) or (G)
Q402 Q404
2SC1845(E)
Q406
2SA954(K) or (L)
Q408 Q410
2SC2320(F)
Q452 Q454
2SC2320(F) or (G) 2SC2060(Q) or (R)
J3
HEADPHONES
D401 1S2473
D403 1S2473
D753 1S2473
D754 1S2473
D402 1S2473
D404 1S2473
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O

SCHEMATIC DIAGRAM

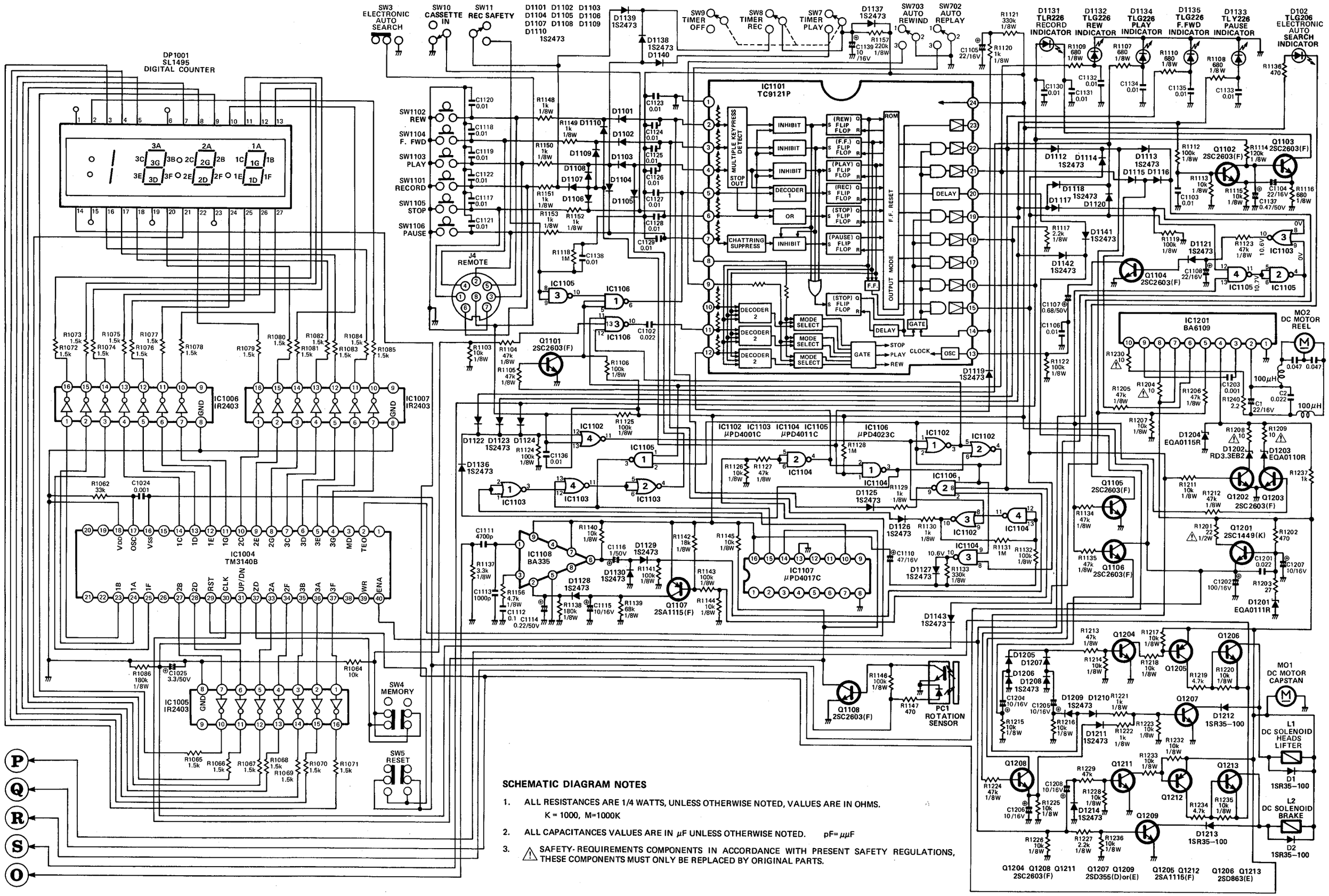


SCHEMATIC DIAGRAM




DP701 GL112F9 Lch PEAK LEVEL DISPLAY
-40 -20 -10 -7 -5 -3 -1 0 +1 +3 +5 +8
D703 1S2473
IC701 BA682A
VR703 500(B)
VR701 10k(B)
NORMAL SLOW
SW701B METER BALLISTICS
Q305 2SA999L(F)
Q303
Q301
Q301 Q303 2SC2320L(F) or (G)
L305 4.7mH
L301 1.8mH
L303 39mH
TC601
RPH1C Lch
RPH1A,B, C,D RECORD PLAYBACK HEAD
Q601 2SC2235(Y)
L601 100μH
BL601 RECORD BIAS OSC
VR601 20k(B)
VR602 20k(B)
VR603 20k(B)
VR3 10k(E) BIAS FINE TRIM
SW601 LN
SW602 FeCr
SW603 CrO2
SW604 METAL
D601 D602 D603 D604 1S2473
EH1 ERASE HEAD
TC602
IC703 μPC4558C
D751 1S2473
D752 1S2473
D755 RD13EB1
Q755 Q756 Q757 Q758 2SC2320(D)
DP702 GL112F9 Rch PEAK LEVEL DISPLAY
D704 1S2473
IC702 BA682A
VR704 500(B)
VR702 10k(B)
SW701A METER BALLISTICS
Q306 2SA999L(F)
Q304
Q302
Q302 Q304 2SC2320L(F) or (G)
L306 4.7mH
L302 1.8mH
L304 39mH
RPH1D Rch
D801 S1VB20
T1 POWER
SW1 POWER
P1 AC120V 60Hz
Q804 2SC2320(F)
Q801 2SC790(Y)
Q803 2SK163(M)
D807 RD5.1EB2
D808 RD24EB2
Q802 2SA965(Y)
D803 D804 D805 D806 1SR35-100
PL1 15V 100mA
PL2 14V 50mA
P
Q
R
S
O

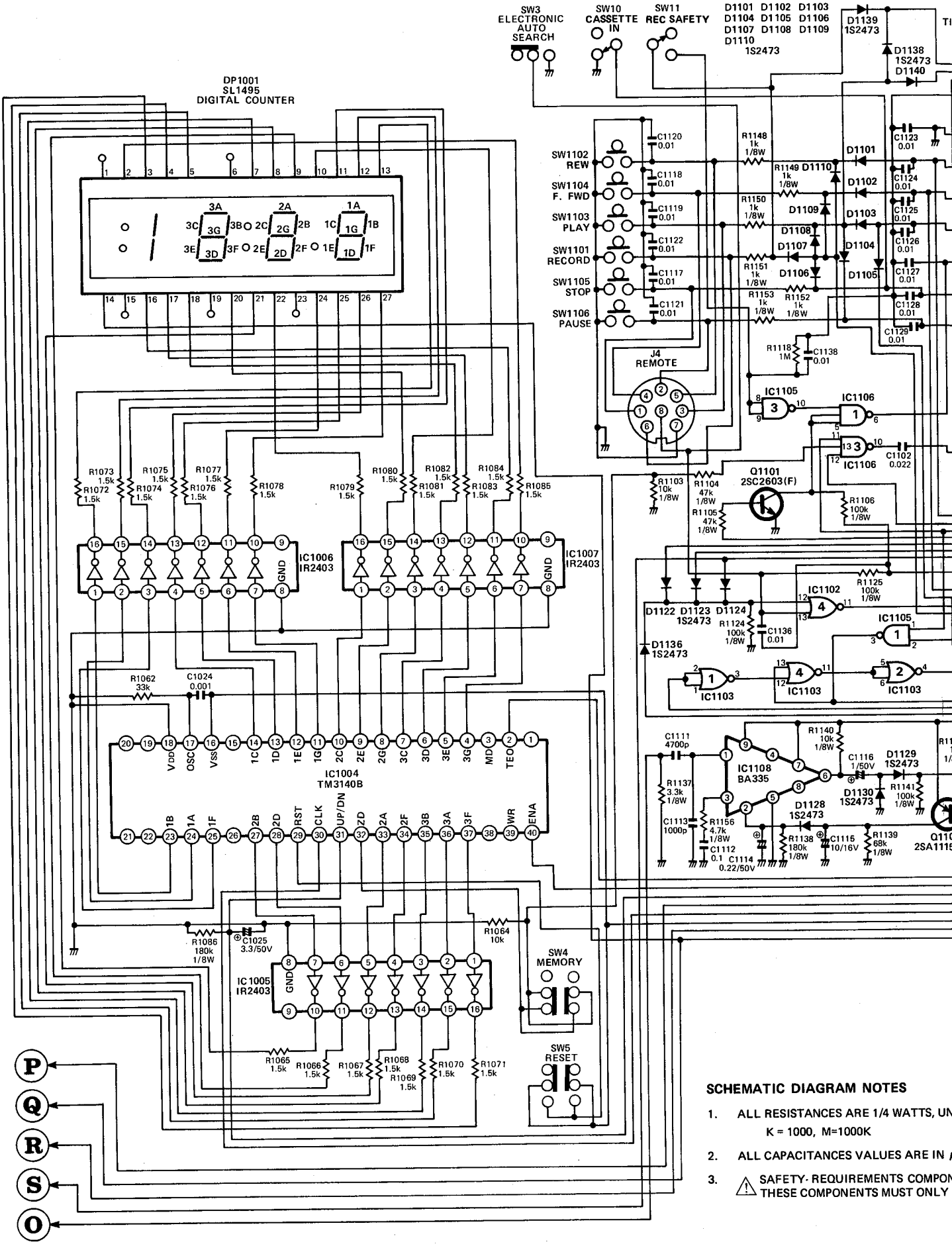
SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM NOTES

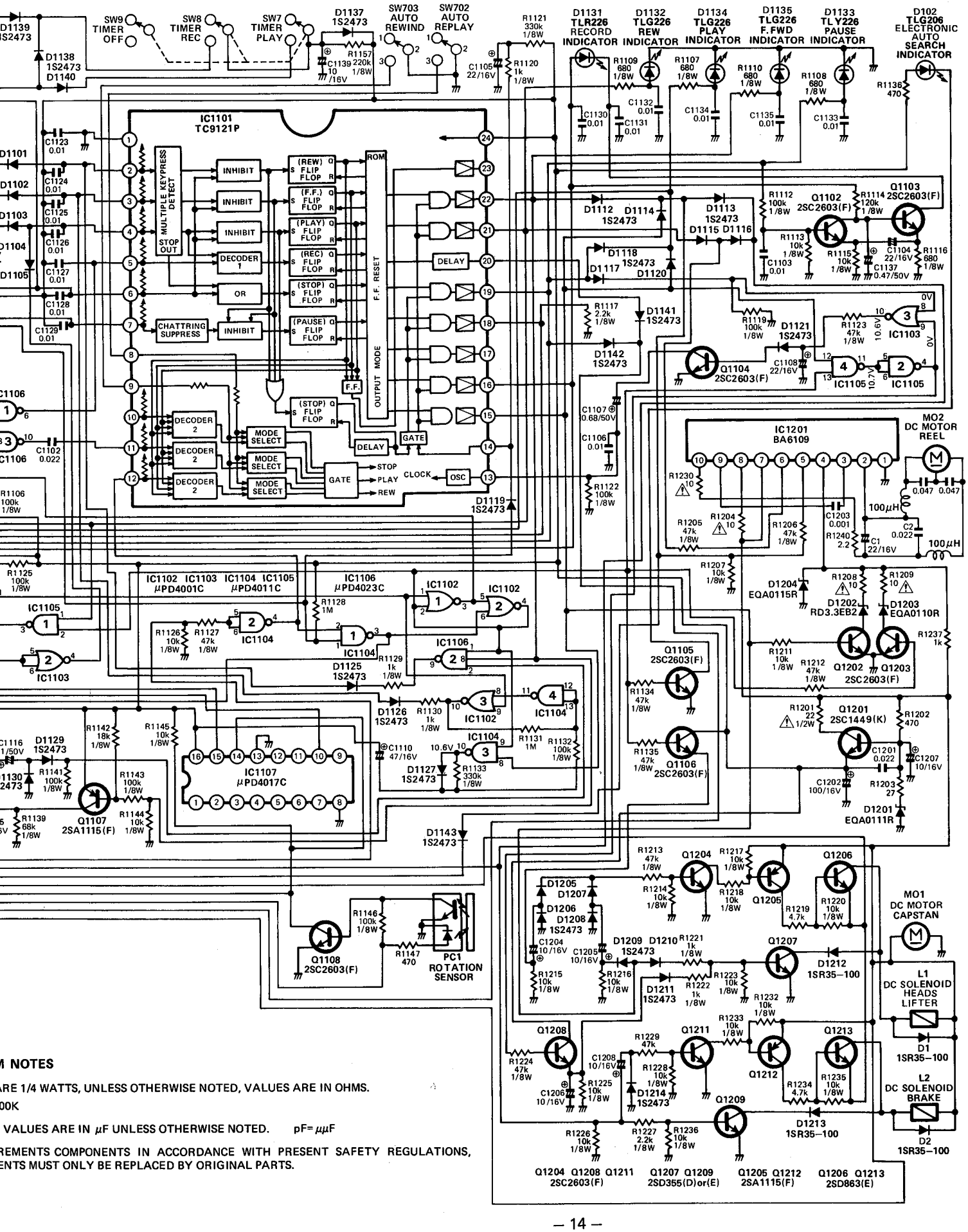
1. ALL RESISTANCES ARE 1/4 WATTS, UNLESS OTHERWISE NOTED, VALUES ARE IN OHMS.
   K = 1000, M=1000K
2. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. pF= μμF
3. ⚠ SAFETY- REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM NOTES

1. ALL RESISTANCES ARE 1/4 WATTS, UN
   K = 1000, M=1000K
2. ALL CAPACITANCES VALUES ARE IN
3. ⚠ SAFETY- REQUIREMENTS COMPON
   THESE COMPONENTS MUST ONLY



M NOTES

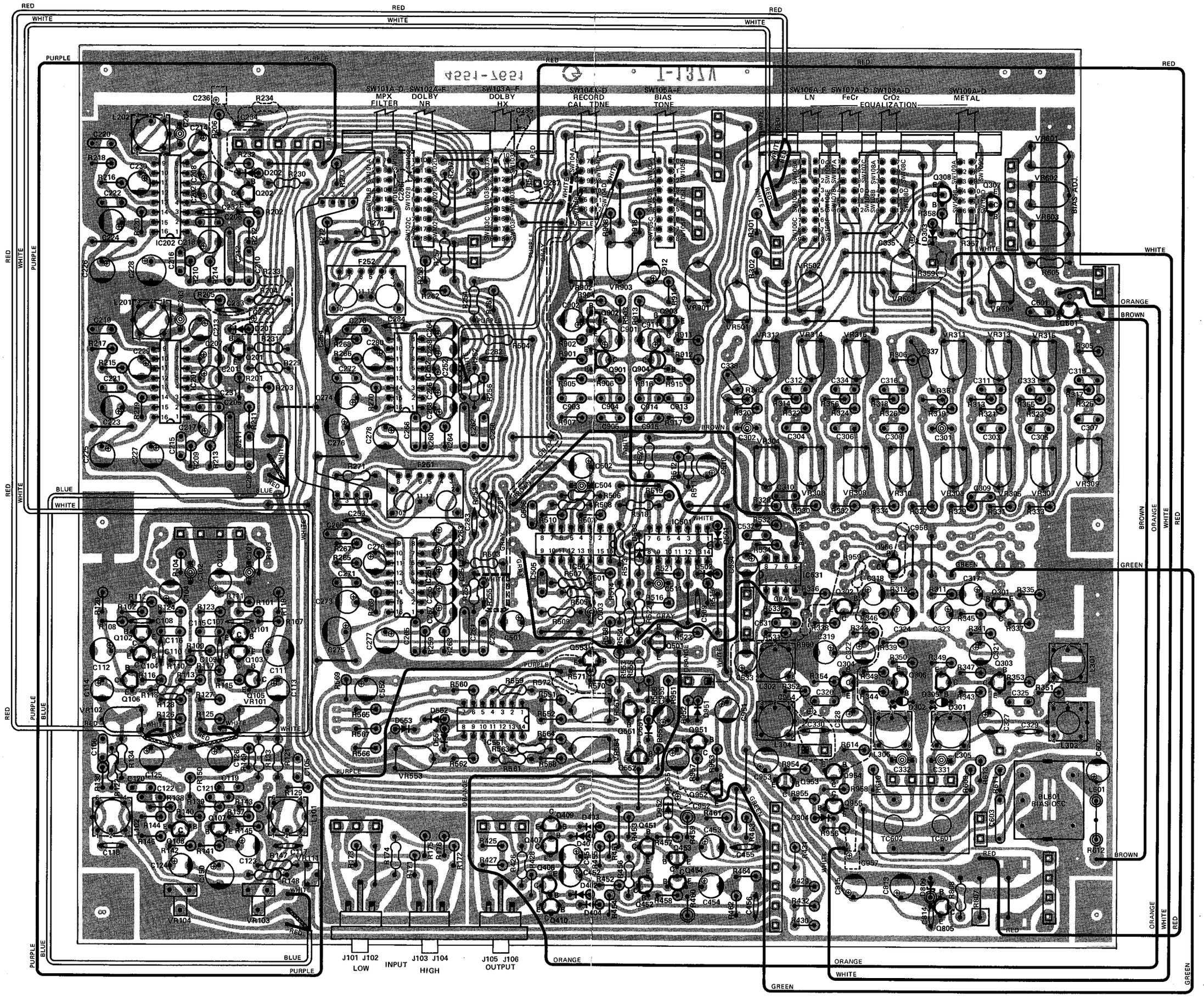
ARE 1/4 WATTS, UNLESS OTHERWISE NOTED, VALUES ARE IN OHMS.

00K

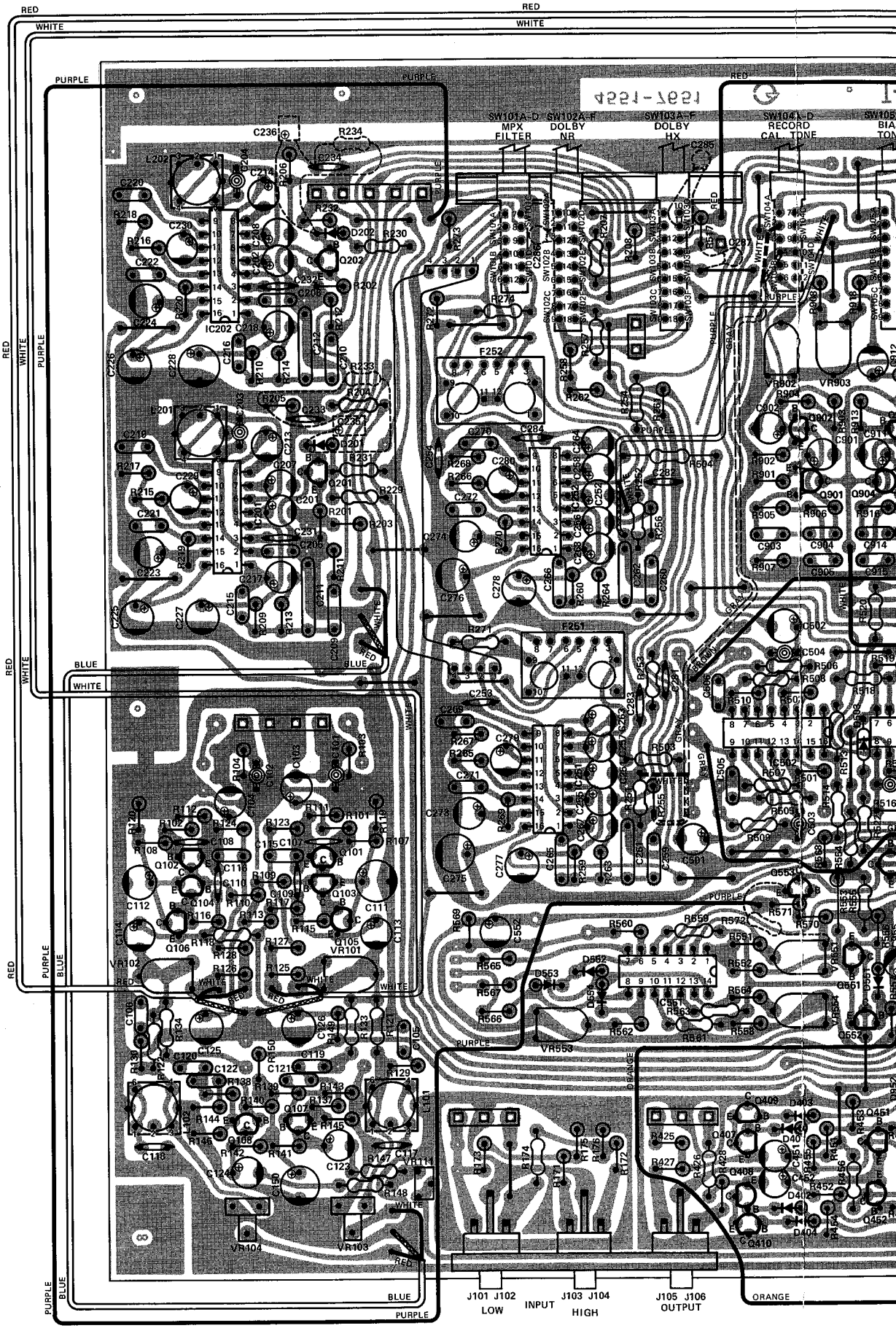
VALUES ARE IN μF UNLESS OTHERWISE NOTED. pF= μμF

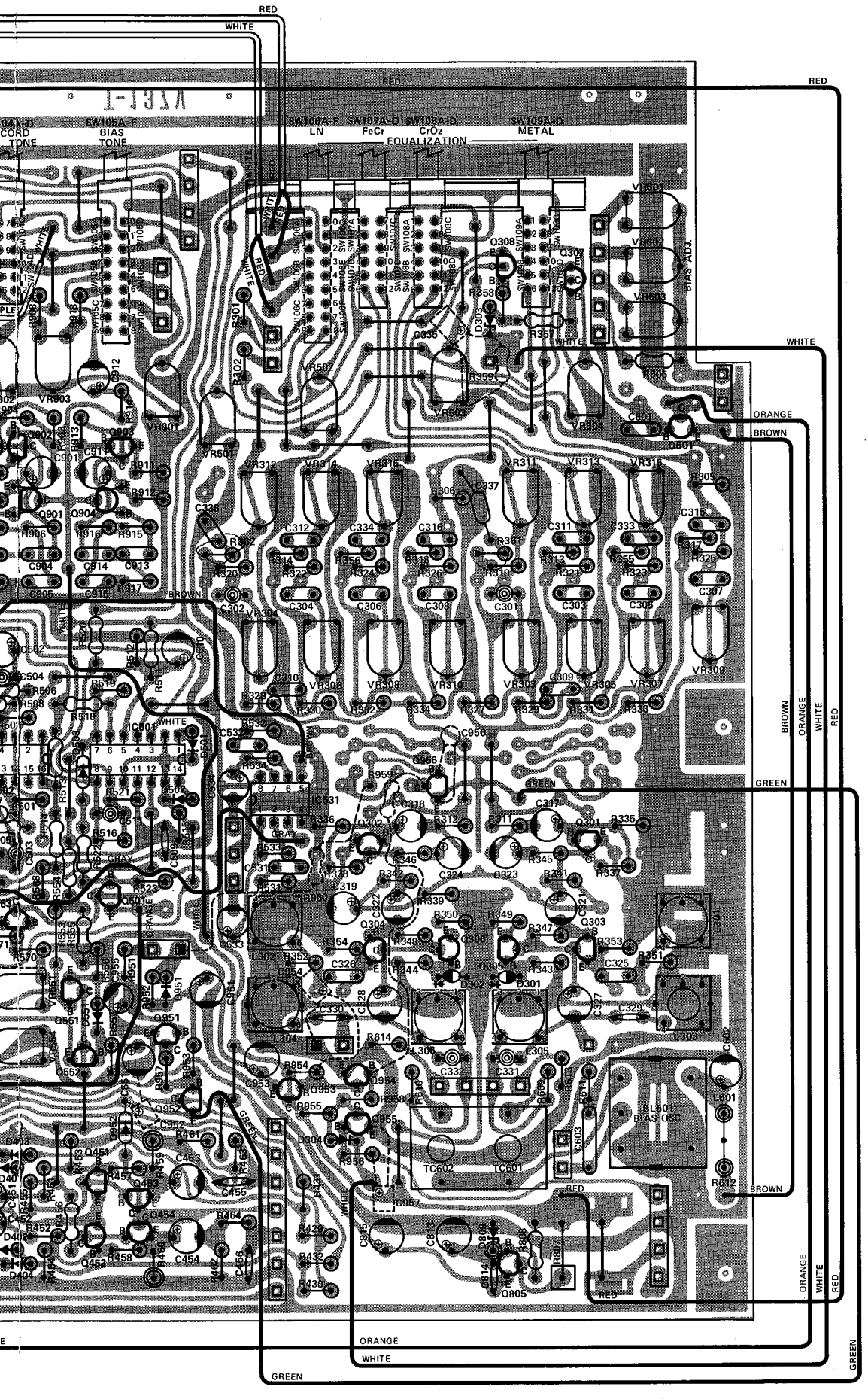
REMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS,
ENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

MAIN P.C. BOARD



MAIN P.C. BOARD




SW108A-F
CORD
TONE
SW108A-F
BIAS
TONE
SW108A-F
LN
SW107A-D
FeCr
SW108A-D
CrO2
EQUALIZATION
SW109A-D
METAL
BIAS ADJ.
RED
WHITE
ORANGE
BROWN
GREEN
GRAY
BLUE
BL601
BIAS OSC

MAIN P.C. BOARD

Ref. No.	Part No.	Description
	RESISTORS	
R612	5102-1004713	10 k ohm +2%–2% 1/4W Fuse
R807	5102-3905711	39 ohm +5%–5% 1W Fuse
VR101, 102, 303, 304, 305, 306, 307, 308, 309, 310	5101-1037187	Variable Resistor, 10 k ohm
VR103, 104	5101-2237179	Variable Resistor, 22 k ohm Dolby NR Playback Calibration Control
VR111	5101-103083V	Variable Resistor, 10 k ohm
VR311, 312, 313, 314, 315, 316, 501, 502, 503, 504	5101-5037187	Variable Resistor, 50 k ohm
VR551, 601, 602, 603	5101-2037187	Variable Resistor, 20 k ohm
VR553, 554	5101-1047187	Variable Resistor, 100 k ohm
VR901, 902	5101-5027187	Variable Resistor, 5 k ohm
VR903	5101-2047187	Variable Resistor, 200 k ohm
	CAPACITORS, ELECTROLYTIC	
C103, 104	5345-226C0212	22uF +20%–20% 16V
C111, 112, 453, 454	5345-107-10	100uF +50%–10% 10V
C113, 114	5345-106D0212	10uF +20%–20% 25V
C123, 124, 602	5345-104F0212	0.1uF +20%–20% 50V
C125	5345-476-25	47uF +50%–10% 25V
C126, 150, 319	5345-107-25	100uF +50%–10% 25V
C201, 202	5345-475D0212	4.7uF +20%–20% 25V
C207, 208, 213, 214, 217, 218, 229, 230, 255, 256, 257, 258, 263, 264, 267, 268, 279, 280, 510, 552, 957	5345-106-16	10uF +50%–10% 16V
C223, 224, 273, 274	5345-334F0212	0.33uF +20%–20% 50V
C225, 226, 275, 276	5345-107-16	100uF +50%–10% 16V
C227, 228, 277, 278	5345-477B041	470uF +50%–10% 10V
C235, 236, 323, 324, 451, 452	5345-475-25	4.7uF +50%–10% 25V
C251, 252	5345-105F0212	1uF +20%–20% 50V
C317, 318, 327, 328, 501, 502	5345-225F0212	2.2uF +20%–20% 50V
C321, 322	5345-335-50	3.3uF +75%–10% 50V
C335, 551, 901, 902, 911, 912, 955	5345-105-50	1uF +75%–10% 50V
C533, 534	5345-106C0212	10uF +20%–20% 16V
C813, 815	5345-227-16	220uF +50%–10% 16V
C951	5345-476D0212	47uF +20%–20% 25V
C952	5345-447D041	470uF +50–10% 25V
C953	5345-106-25	10uF +50–10% 25V
C954	5345-476D041	47uF +50%–10% 25V
TC601, 602	5372-61	Trimmer Capacitor
	INTEGRATED CIRCUITS	
IC201, 202, 251, 252	5652-LM1011N	LM1011N Dolby NR Amp.
IC501	5652-LM324	LM324 Dolby HX Control
IC502	5652-LM13600N	LM13600N Dolby HX Variable Equalizer
IC531	5652-uPC4558C	uPC4558C Buffer Amp.
IC551	5652-uPC324C	uPC324C Headroom Safety Indicators Driver
	TRANSISTORS	
Q101, 102	5613-2263(T)	2SC2263(T)or(U) Play Equalizer Amp.
Q103, 104	5613-2320L(F)	2SC2320L(F)or(G) Play Equalizer Amp.

MAIN P.C. BOARD

Ref. No.	Part No.	Description
	TRANSISTORS (continued)	
Q105, 106	5611-999L(F)	2SA999L(F) Play Equalizer Amp.
Q107, 108	5613-2320(F)	2SC2320(F)or(G) Electronic Auto Search Amp.
Q201, 202	5613-2320(F)	2SC2320(F) Muting
Q301, 302, 303, 304	5613-2320L(F)	2SC2320L(F)or(G) Rec. Equalizer Amp.
Q305, 306	5611-999L(F)	2SA999L(F) Rec. Equalizer Amp.
Q307, 308	5613-2320(F)	2SC2320(F) Rec. Mute
Q407, 408, 409, 410	5613-2320(F)	2SC2320(F) Audio Muting
Q451, 452	5613-2320(F)	2SC2320(F)or(G) Buffer Amp.
Q453, 454	5613-2060(Q)	2SC2060(Q)or(R) Headphones Amp.
Q501	5613-2235(Y)	2SC2235(Y) Dolby HX Bias Control
Q551, 552	5613-2320(F)	2SC2320(F)or(G) Headroom Safety Control
Q553	5613-2320(F)	2SC2320(F)or(G) Headroom Safety Switching
Q601	5613-2235(Y)	2SC2235(Y) Bias Control
Q805	5613-2235(Y)	2SC2235(Y) Voltage Regulator
Q901, 902	5613-2320(F)	2SC2320(F) Record Calibration Tone Osc. (315 Hz)
Q903, 904	5613-2320(F)	2SC2320(F) Bias Tone Osc. (12.5 kHz)
Q951	5613-2320(F)	2SC2320(F)or(G) Muting
Q952	5611-999(F)	2SA999(F) Muting
Q953	5613-2060(Q)	2SC2060(Q)or(R) Rec. Detector
Q954, 955	5613-2320(F)	2SC2320(F)or(G) Rec. Detector
Q956	5611-999(F)	2SA999(F) Switching
	DIODES	
D201, 202, 304, 401, 402, 403, 404, 501, 502, 503, 551, 552, 553, 554, 951, 952	5631-1S2473	1S2473
D301, 302	5641-MV11	Varistor, MV11
D303	5635-RD5R1EB2	Zener, RD5.1EB2
D809	5635-RD13EB2	Zener, RD13EB2
	COILS	
L101, 102	5933-70314	27 mH Bisa Trap
L201, 202, 305, 306	5933-70416	4.7 mH Bias Trap
L301, 302	5933-70516	1.8 mH Peaking
L303, 304	5933-70214	39 mH Bias Trap
L601	5995-101325	100 uH Choke
	MISCELLANEOUS	
F251, 252	5214-18	LC Components, MPX Filter
BL601	6171-0403	Complex, Bias Oscillator
SW101A-D, 102A-F, 103A-F	4431-03167750	3-Gang Push Switch, MPX Filter, Dolby NR, Dolby HX
SW104A-D	4431-01047494	Push Switch, Record Calibration Tone
SW105A-F	4431-01067594	Push Switch, Bias Tone
SW106A-F, 107A-D, 108A-D, 109A-D	4431-04187457	4-Gang Push Switch, Tape Selector (Equalization)
J101, 102, 103, 104, 105, 106	4486-7	6-Pin Jack, Line Input (Low, High), Line Output

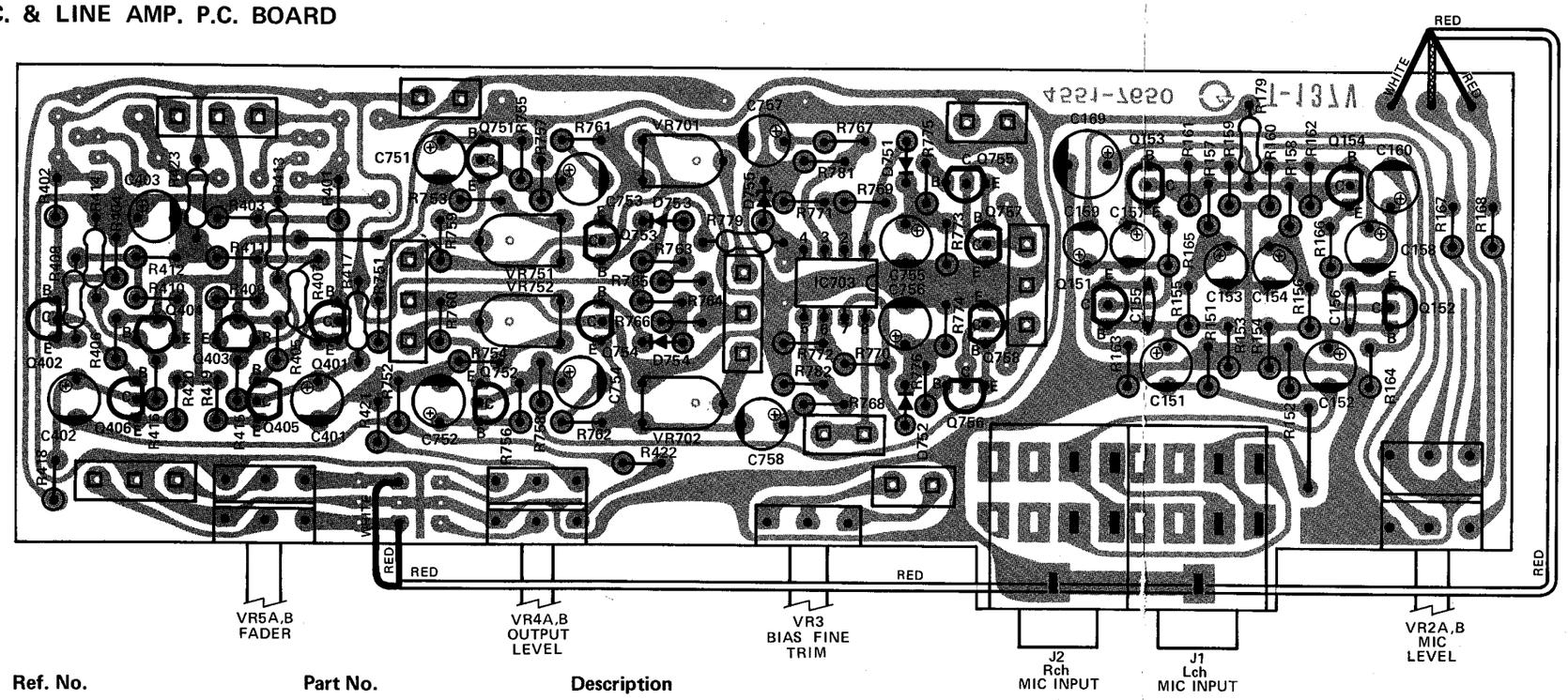
MAIN P.C. BOARD

Ref. No.	Part No.	Description
	RESISTORS	
R612	5102-1004713	10 k ohm +2%–2% 1/4W Fuse
R807	5102-3905711	39 ohm +5%–5% 1W Fuse
VR101, 102, 303, 304, 305, 306, 307, 308, 309, 310	5101-1037187	Variable Resistor, 10 k ohm
VR103, 104	5101-2237179	Variable Resistor, 22 k ohm Dolby NR Playback Calibration Control
VR111	5101-103083V	Variable Resistor, 10 k ohm
VR311, 312, 313, 314, 315, 316, 501, 502, 503, 504	5101-5037187	Variable Resistor, 50 k ohm
VR551, 601, 602, 603	5101-2037187	Variable Resistor, 20 k ohm
VR553, 554	5101-1047187	Variable Resistor, 100 k ohm
VR901, 902	5101-5027187	Variable Resistor, 5 k ohm
VR903	5101-2047187	Variable Resistor, 200 k ohm
	CAPACITORS, ELECTROLYTIC	
C103, 104	5345-226C0212	22uF +20%–20% 16V
C111, 112, 453, 454	5345-107-10	100uF +50%–10% 10V
C113, 114	5345-106D0212	10uF +20%–20% 25V
C123, 124, 602	5345-104F0212	0.1uF +20%–20% 50V
C125	5345-476-25	47uF +50%–10% 25V
C126, 150, 319	5345-107-25	100uF +50%–10% 25V
C201, 202	5345-475D0212	4.7uF +20%–20% 25V
C207, 208, 213, 214, 217, 218, 229, 230, 255, 256, 257, 258, 263, 264, 267, 268, 279, 280, 510, 552, 957	5345-106-16	10uF +50%–10% 16V
C223, 224, 273, 274	5345-334F0212	0.33uF +20%–20% 50V
C225, 226, 275, 276	5345-107-16	100uF +50%–10% 16V
C227, 228, 277, 278	5345-477B041	470uF +50%–10% 10V
C235, 236, 323, 324, 451, 452	5345-475-25	4.7uF +50%–10% 25V
C251, 252	5345-105F0212	1uF +20%–20% 50V
C317, 318, 327, 328, 501, 502	5345-225F0212	2.2uF +20%–20% 50V
C321, 322	5345-335-50	3.3uF +75%–10% 50V
C335, 551, 901, 902, 911, 912, 955	5345-105-50	1uF +75%–10% 50V
C533, 534	5345-106C0212	10uF +20%–20% 16V
C813, 815	5345-227-16	220uF +50%–10% 16V
C951	5345-476D0212	47uF +20%–20% 25V
C952	5345-447D041	470uF +50–10% 25V
C953	5345-106-25	10uF +50–10% 25V
C954	5345-476D041	47uF +50%–10% 25V
TC601, 602	5372-61	Trimmer Capacitor
	INTEGRATED CIRCUITS	
IC201, 202, 251, 252	5652-LM1011N	LM1011N Dolby NR Amp.
IC501	5652-LM324	LM324 Dolby HX Control
IC502	5652-LM13600N	LM13600N Dolby HX Variable Equalizer
IC531	5652-uPC4558C	uPC4558C Buffer Amp.
IC551	5652-uPC324C	uPC324C Headroom Safety Indicators Driver
	TRANSISTORS	
Q101, 102	5613-2263(T)	2SC2263(T)or(U) Play Equalizer Amp.
Q103, 104	5613-2320L(F)	2SC2320L(F)or(G) Play Equalizer Amp.

MAIN P.C. BOARD

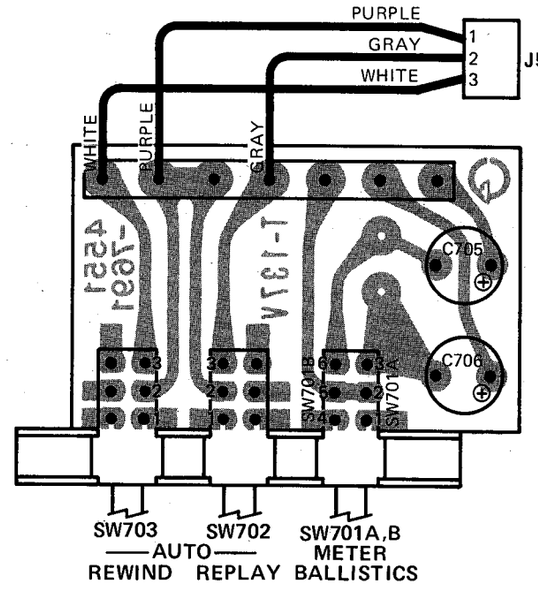
Ref. No.	Part No.	Description
	TRANSISTORS (continued)	
Q105, 106	5611-999L(F)	2SA999L(F) Play Equalizer Amp.
Q107, 108	5613-2320(F)	2SC2320(F)or(G) Electronic Auto Search Amp.
Q201, 202	5613-2320(F)	2SC2320(F) Muting
Q301, 302, 303, 304	5613-2320L(F)	2SC2320L(F)or(G) Rec. Equalizer Amp.
Q305, 306	5611-999L(F)	2SA999L(F) Rec. Equalizer Amp.
Q307, 308	5613-2320(F)	2SC2320(F) Rec. Mute
Q407, 408, 409, 410	5613-2320(F)	2SC2320(F) Audio Muting
Q451, 452	5613-2320(F)	2SC2320(F)or(G) Buffer Amp.
Q453, 454	5613-2060(Q)	2SC2060(Q)or(R) Headphones Amp.
Q501	5613-2235(Y)	2SC2235(Y) Dolby HX Bias Control
Q551, 552	5613-2320(F)	2SC2320(F)or(G) Headroom Safety Control
Q553	5613-2320(F)	2SC2320(F)or(G) Headroom Safety Switching
Q601	5613-2235(Y)	2SC2235(Y) Bias Control
Q805	5613-2235(Y)	2SC2235(Y) Voltage Regulator
Q901, 902	5613-2320(F)	2SC2320(F) Record Calibration Tone Osc. (315 Hz)
Q903, 904	5613-2320(F)	2SC2320(F) Bias Tone Osc. (12.5 kHz)
Q951	5613-2320(F)	2SC2320(F)or(G) Muting
Q952	5611-999(F)	2SA999(F) Muting
Q953	5613-2060(Q)	2SC2060(Q)or(R) Rec. Detector
Q954, 955	5613-2320(F)	2SC2320(F)or(G) Rec. Detector
Q956	5611-999(F)	2SA999(F) Switching
	DIODES	
D201, 202, 304, 401, 402, 403, 404, 501, 502, 503, 551, 552, 553, 554, 951, 952	5631-1S2473	1S2473
D301, 302	5641-MV11	Varistor, MV11
D303	5635-RD5R1EB2	Zener, RD5.1EB2
D809	5635-RD13EB2	Zener, RD13EB2
	COILS	
L101, 102	5933-70314	27 mH Bisa Trap
L201, 202, 305, 306	5933-70416	4.7 mH Bias Trap
L301, 302	5933-70516	1.8 mH Peaking
L303, 304	5933-70214	39 mH Bias Trap
L601	5995-101325	100 uH Choke
	MISCELLANEOUS	
F251, 252	5214-18	LC Components, MPX Filter
BL601	6171-0403	Complex, Bias Oscillator
SW101A-D, 102A-F, 103A-F	4431-03167750	3-Gang Push Switch, MPX Filter, Dolby NR, Dolby HX
SW104A-D	4431-01047494	Push Switch, Record Calibration Tone
SW105A-F	4431-01067594	Push Switch, Bias Tone
SW106A-F, 107A-D, 108A-D, 109A-D	4431-04187457	4-Gang Push Switch, Tape Selector (Equalization)
J101, 102, 103, 104, 105, 106	4486-7	6-Pin Jack, Line Input (Low, High), Line Output

MIC. & LINE AMP. P.C. BOARD



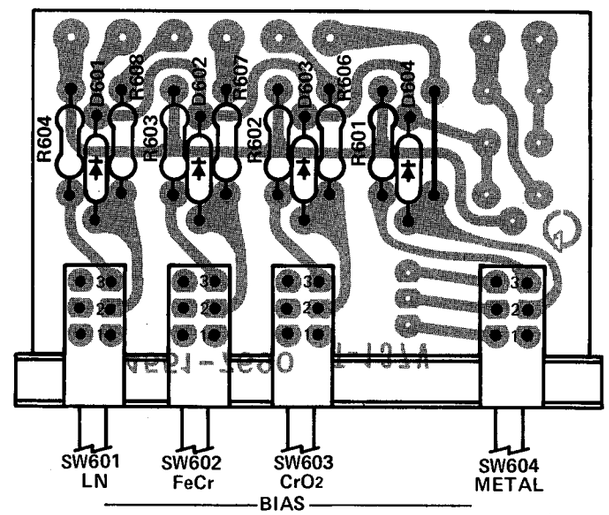
Ref. No.	Part No.	Description
	RESISTORS	
VR2A, B	5113-5037182	Variable Resistor, 50 k ohm Mic. Level Control
VR3	5113-1037621	Variable Resistor, 10 k ohm Bias Fine Trim Control
VR4A, B	5113-5027F40	Variable Resistor, 5 k ohm Output Level Control
VR5A, B	5113-50374122	Variable Resistor, 50 k ohm Fader Control
VR701, 702	5101-1037187	Variable Resistor, 10 k ohm
VR751, 752	5101-5017187	Variable Resistor, 500 ohm
	CAPACITORS, ELECTROLYTIC	
C151, 152, 159, 160	5345-106C0212	10uF +20%—20% 16V
C153, 154	5345-105-50	1uF +75%—10% 50V
C157, 158, 403	5345-106-16	10uF +50%—10% 16V
C169	5345-107-25	100uF +50%—10% 25V
C401, 402	5345-476-25	47uF +50%—10% 25V
C751, 752	5345-475-25	4.7uF +50%—10% 25V
C753, 754	5345-106-25	10uF +50%—10% 25V
C755, 756	5345-226C0212	22uF +20%—20% 16V
C757, 758	5345-224F0212	0.22uF +20%—20% 50V
	INTEGRATED CIRCUIT	
IC703	5652-uPC4558C	uPC4558C —40dB Pre-Driver
	TRANSISTORS	
Q151, 152, 153, 154	5613-2320L(F)	2SC2320L(F)or(G) Mic. Amp.
Q401, 402, 403, 404	5613-1845(E)	2SC1845(E) Line Output Amp.
Q405, 406	5611-954(K)	2SA954(K)or(L) Line Output Amp.
Q751, 752	5613-2320(F)	2SC2320(F)or(G) Bias Calibration Amp.
Q753, 754	5613-2320(F)	2SC2320(F)or(G) Muting
Q755, 756, 757, 758	5613-2320(D)	2SC2320(D) —40dB LED Driver
	DIODES	
D751, 752, 753, 754	5631-1S2473	1S2473
D755	5635-RD13EB1	Zener, RD13EB1
	JACKS	
J1, 2	4451-00106	Microphone

METER/AUTO PLAY SWITCH P.C. BOARD



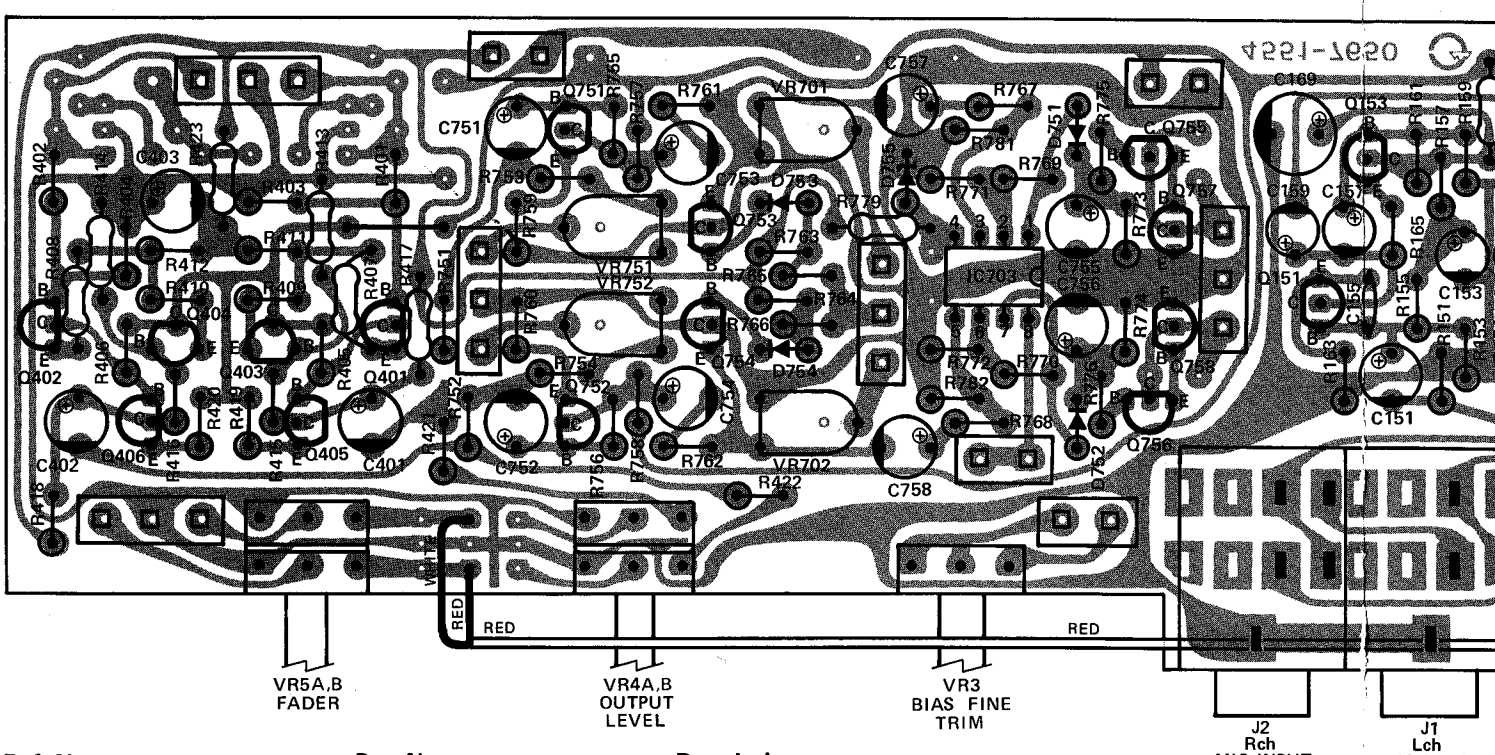
Ref. No.	Part No.	Description
SW701A, B, 702, 703	4431-03067650	3-Gang Push Switch, Meter Ballistics, Auto Replay, Auto Rewind
C705, 706	5345-226C0212	Capacitor, 22uF +20%—20% 16V Electrolytic

BIAS SELECTOR SWITCH P.C. BOARD

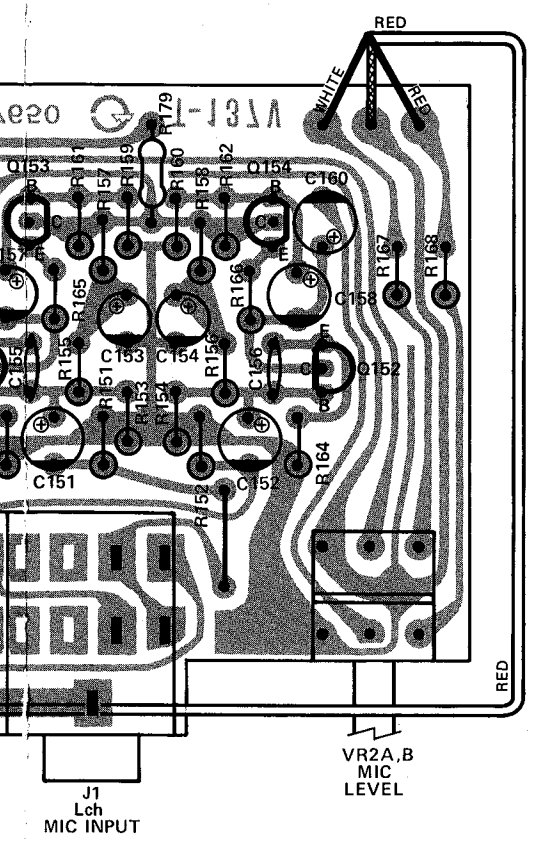


Ref. No.	Part No.	Description
SW601, 602, 603, 604	4431-04087557	4-Gang Push Switch, Tape Selector (Bias)
D601, 602, 603, 604	5631-1S2473	Diode, 1S2473

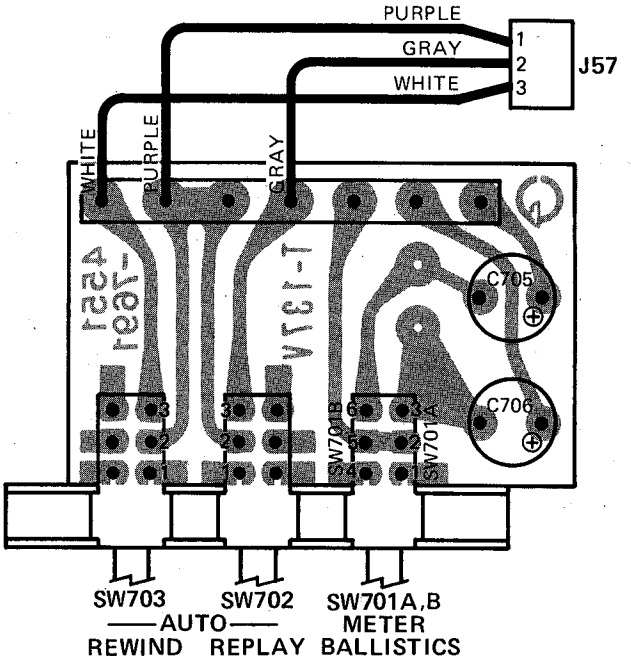
MIC. & LINE AMP. P.C. BOARD



Ref. No.	Part No.	Description
	RESISTORS	
VR2A, B	5113-5037182	Variable Resistor, 50 k ohm Mic. Level Control
VR3	5113-1037621	Variable Resistor, 10 k ohm Bias Fine Trim Control
VR4A, B	5113-5027F40	Variable Resistor, 5 k ohm Output Level Control
VR5A, B	5113-50374122	Variable Resistor, 50 k ohm Fader Control
VR701, 702	5101-1037187	Variable Resistor, 10 k ohm
VR751, 752	5101-5017187	Variable Resistor, 500 ohm
	CAPACITORS, ELECTROLYTIC	
C151, 152, 159, 160	5345-106C0212	10uF +20%—20% 16V
C153, 154	5345-105-50	1uF +75%—10% 50V
C157, 158, 403	5345-106-16	10uF +50%—10% 16V
C169	5345-107-25	100uF +50%—10% 25V
C401, 402	5345-476-25	47uF +50%—10% 25V
C751, 752	5345-475-25	4.7uF +50%—10% 25V
C753, 754	5345-106-25	10uF +50%—10% 25V
C755, 756	5345-226C0212	22uF +20%—20% 16V
C757, 758	5345-224F0212	0.22uF +20%—20% 50V
	INTEGRATED CIRCUIT	
IC703	5652-uPC4558C	uPC4558C —40dB Pre-Driver
	TRANSISTORS	
Q151, 152, 153, 154	5613-2320L(F)	2SC2320L(F)or(G) Mic. Amp.
Q401, 402, 403, 404	5613-1845(E)	2SC1845(E) Line Output Amp.
Q405, 406	5611-954(K)	2SA954(K)or(L) Line Output Amp.
Q751, 752	5613-2320(F)	2SC2320(F)or(G) Bias Calibration Amp.
Q753, 754	5613-2320(F)	2SC2320(F)or(G) Muting
Q755, 756, 757, 758	5613-2320(D)	2SC2320(D) —40dB LED Driver
	DIODES	
D751, 752, 753, 754	5631-1S2473	1S2473
D755	5635-RD13EB1	Zener, RD13EB1
	JACKS	
J1, 2	4451-00106	Microphone

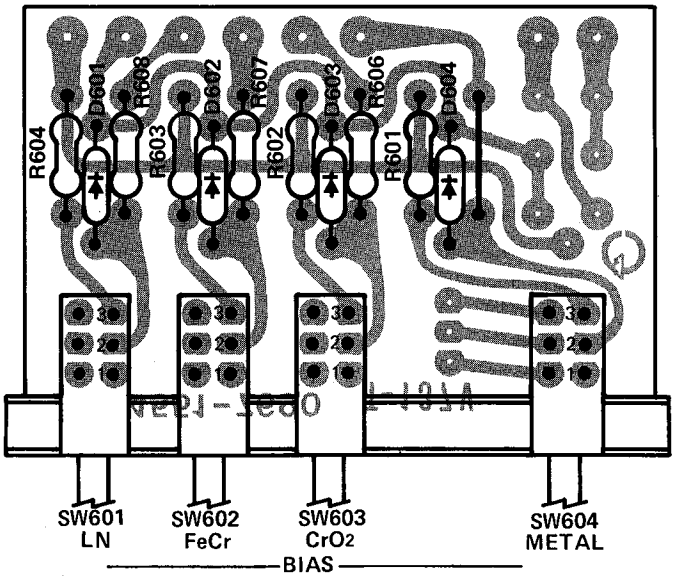


METER/AUTO PLAY SWITCH P.C. BOARD



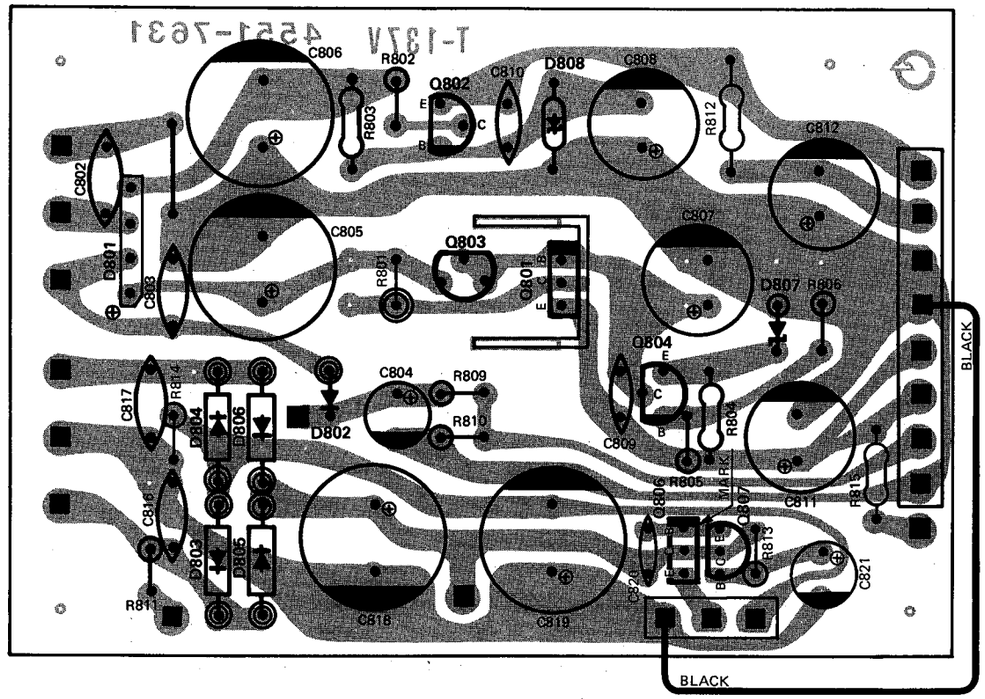
Ref. No.	Part No.	Description
SW701A, B, 702, 703	4431-03067650	3-Gang Push Switch, Meter Ballistics, Auto Replay, Auto Rewind
C705, 706	5345-226C0212	Capacitor, 22uF +20%—20% 16V Electrolytic

BIAS SELECTOR SWITCH P.C. BOARD



Ref. No.	Part No.	Description
SW601, 602, 603, 604	4431-04087557	4-Gang Push Switch, Tape Selector (Bias)
D601, 602, 603, 604	5631-1S2473	Diode, 1S2473

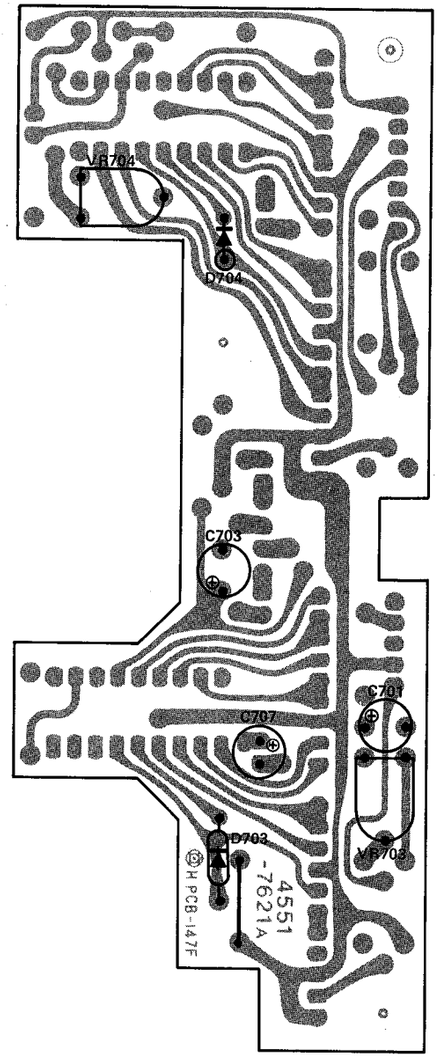
POWER SUPPLY P.C. BOARD



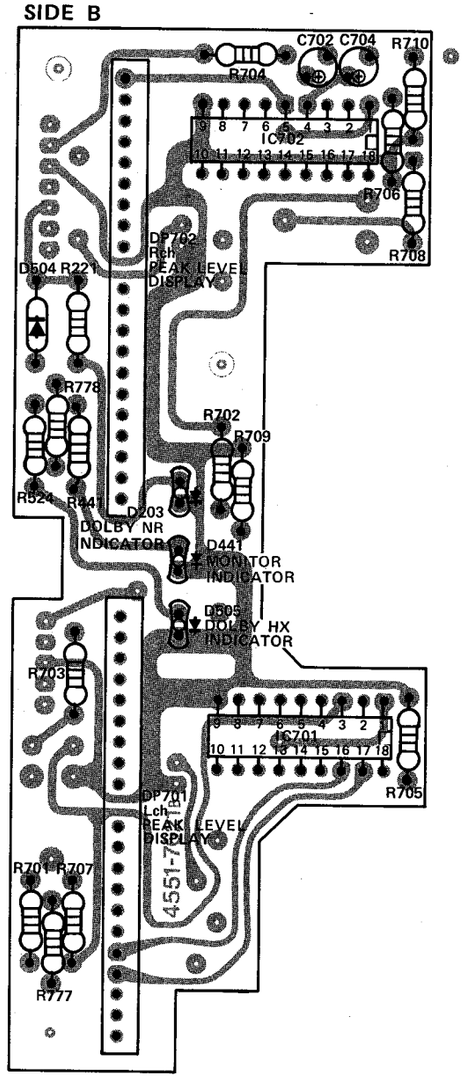
Ref. No.	Part No.	Description
	RESISTORS, FUSE	
R801	5102-3R35710	3.3 ohm +5%—5% 1/2W
R802	5102-1004713	10 ohm +2%—2% 1/4W
R811	5102-2704713	27 ohm +2%—2% 1/4W
R812	5102-1204713	12 ohm +2%—2% 1/4W
	CAPACITORS, ELECTROLYTIC	
C804	5345-106-50	10uF +50%—10% 50V
C805, 806	5345-108F041	1000uF +50%—10% 50V
C807, 811	5345-477E041	470uF +50%—10% 35V
C808, 812	5345-477D041	470uF +50%—10% 25V
C818, 819	5345-228-25	2200uF +50%—10% 25V
C821	5345-107D041	100uF +50%—10% 25V
	TRANSISTORS	
Q801	5613-790(Y)	2SC790(Y) Voltage Regulator
Q802	5611-965(Y)	2SA965(Y) Voltage Regulator
Q803	5616-2SK163(M	F.E.T., 2SK163(M) Current Regulator
Q804, 807	5613-2320(F)	2SC2320(F) Voltage Regulator
Q806	5614-415(Q)	2SD415(Q)or(R) Voltage Regulator
	DIODES	
D801	5685-S1VB20	Bridge Silicon, S1VB20
D802, 803, 804, 805, 806	5632-1SR35-10	1SR35-100
D807	5635-RD5R1EB2	Zener, RD5.1EB2
D808	5635-RD24EB2	Zener, RD24EB2

PEAK LEVEL DISPLAY P.C. BOARD

SIDE A

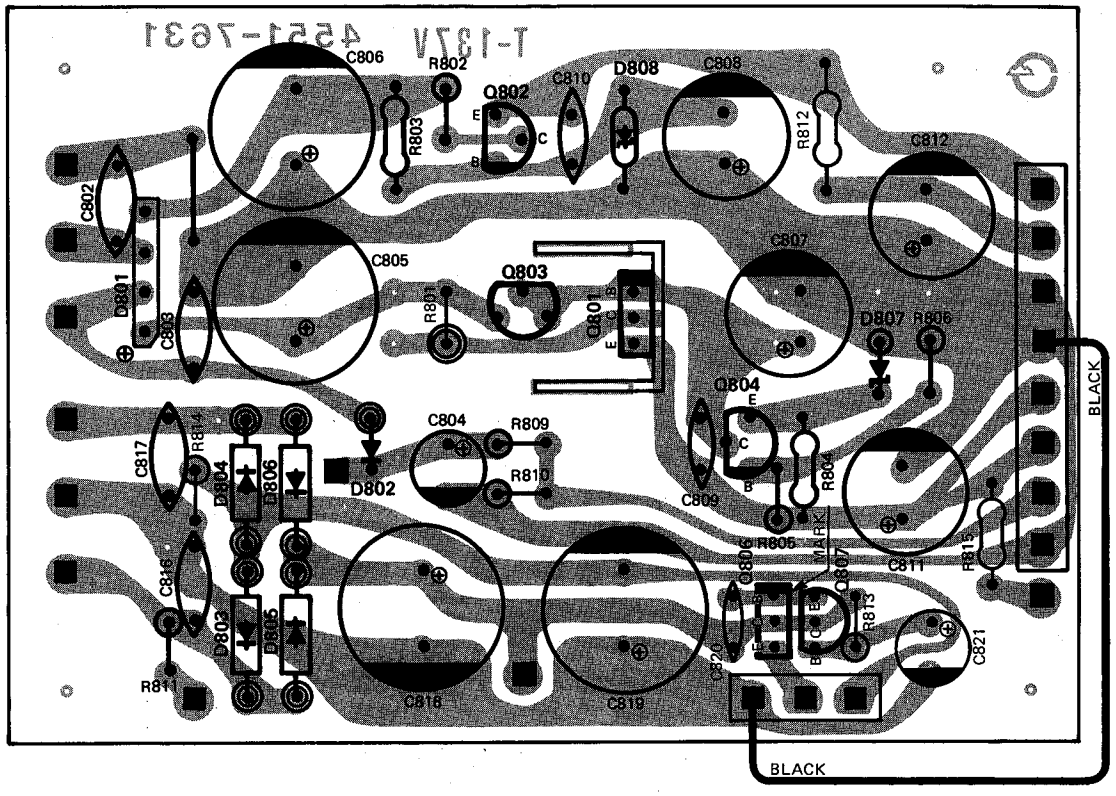


SIDE B



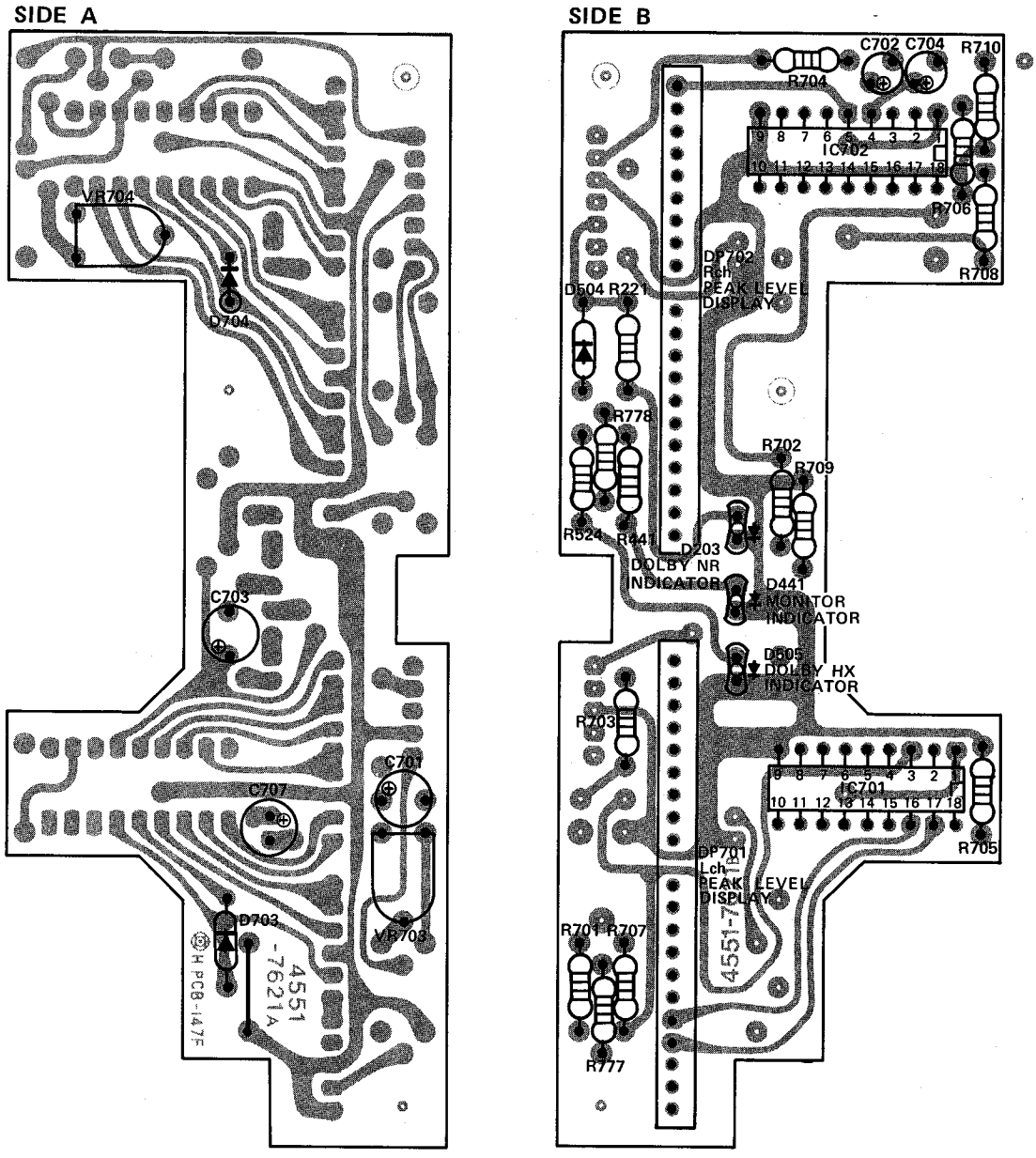
Ref. No.	Part No.	Description
	RESISTORS	
VR703, 704	5101-5017187	Variable Resistor, 500 ohm
	CAPACITORS, ELECTROLYTIC	
C701, 702, 707	5345-106-16	10uF +50%—10% 16V
C703, 704	5345-226C0212	22uF +20%—20% 16V
	INTEGRATED CIRCUITS	
IC701, 702	5652-BA682A	BA682A Peak Level Display Driver
	DIODES	
D203, 505	5637-TLG226	Light Emitting Diode, TLG226 Dolby NR Indicator, Dolby HX Indicator
D441	5637-TLR226	Light Emitting Diode, TLR226 Monitor Indicator
D504	5632-1SR35-10	1SR35-100
D703, 704	5631-1S2473	1S2473
DP701, 702	5623-GL112F9	LED Display, GL112F9 Peak Level

POWER SUPPLY P.C. BOARD



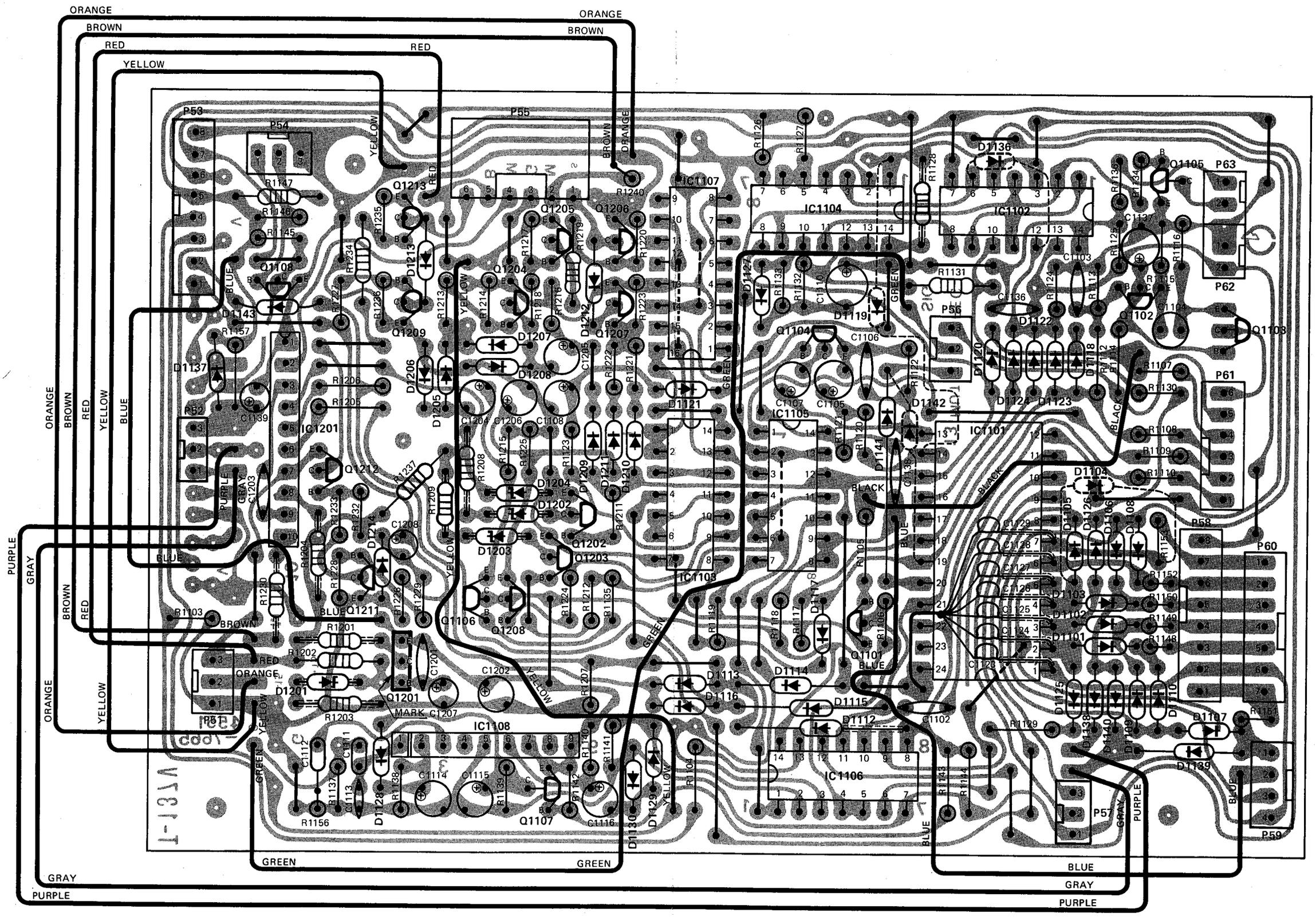
Ref. No.	Part No.	Description
	RESISTORS, FUSE	
R801	5102-3R35710	3.3 ohm +5%—5% 1/2W
R802	5102-1004713	10 ohm +2%—2% 1/4W
R811	5102-2704713	27 ohm +2%—2% 1/4W
R812	5102-1204713	12 ohm +2%—2% 1/4W
	CAPACITORS, ELECTROLYTIC	
C804	5345-106-50	10uF +50%—10% 50V
C805, 806	5345-108F041	1000uF +50%—10% 50V
C807, 811	5345-477E041	470uF +50%—10% 35V
C808, 812	5345-477D041	470uF +50%—10% 25V
C818, 819	5345-228-25	2200uF +50%—10% 25V
C821	5345-107D041	100uF +50%—10% 25V
	TRANSISTORS	
Q801	5613-790(Y)	2SC790(Y) Voltage Regulator
Q802	5611-965(Y)	2SA965(Y) Voltage Regulator
Q803	5616-2SK163(M	F.E.T., 2SK163(M) Current Regulator
Q804, 807	5613-2320(F)	2SC2320(F) Voltage Regulator
Q806	5614-415(Q)	2SD415(Q)or(R) Voltage Regulator
	DIODES	
D801	5685-S1VB20	Bridge Silicon, S1VB20
D802, 803, 804, 805, 806	5632-1SR35-10	1SR35-100
D807	5635-RD5R1EB2	Zener, RD5.1EB2
D808	5635-RD24EB2	Zener, RD24EB2

PEAK LEVEL DISPLAY P.C. BOARD

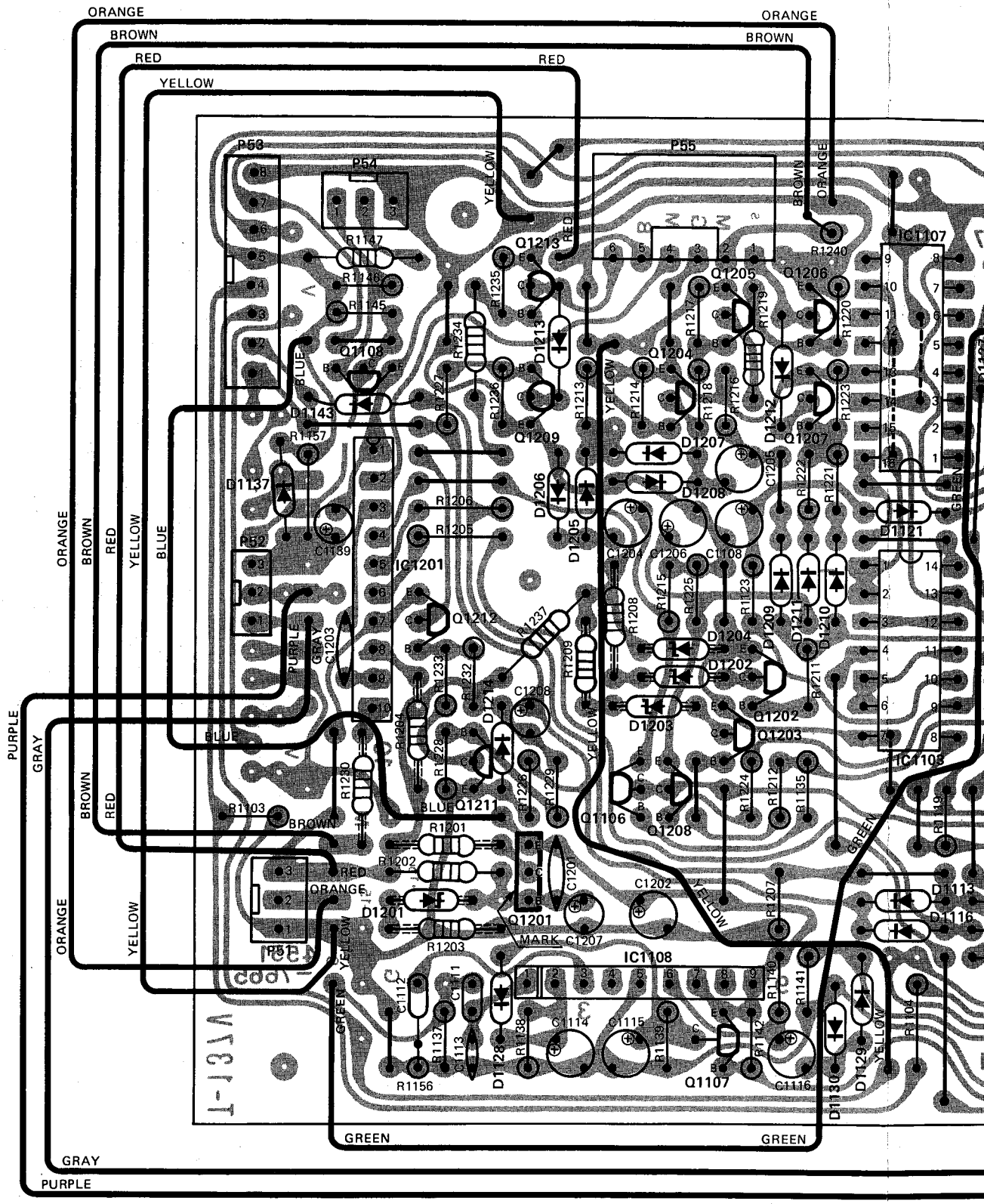


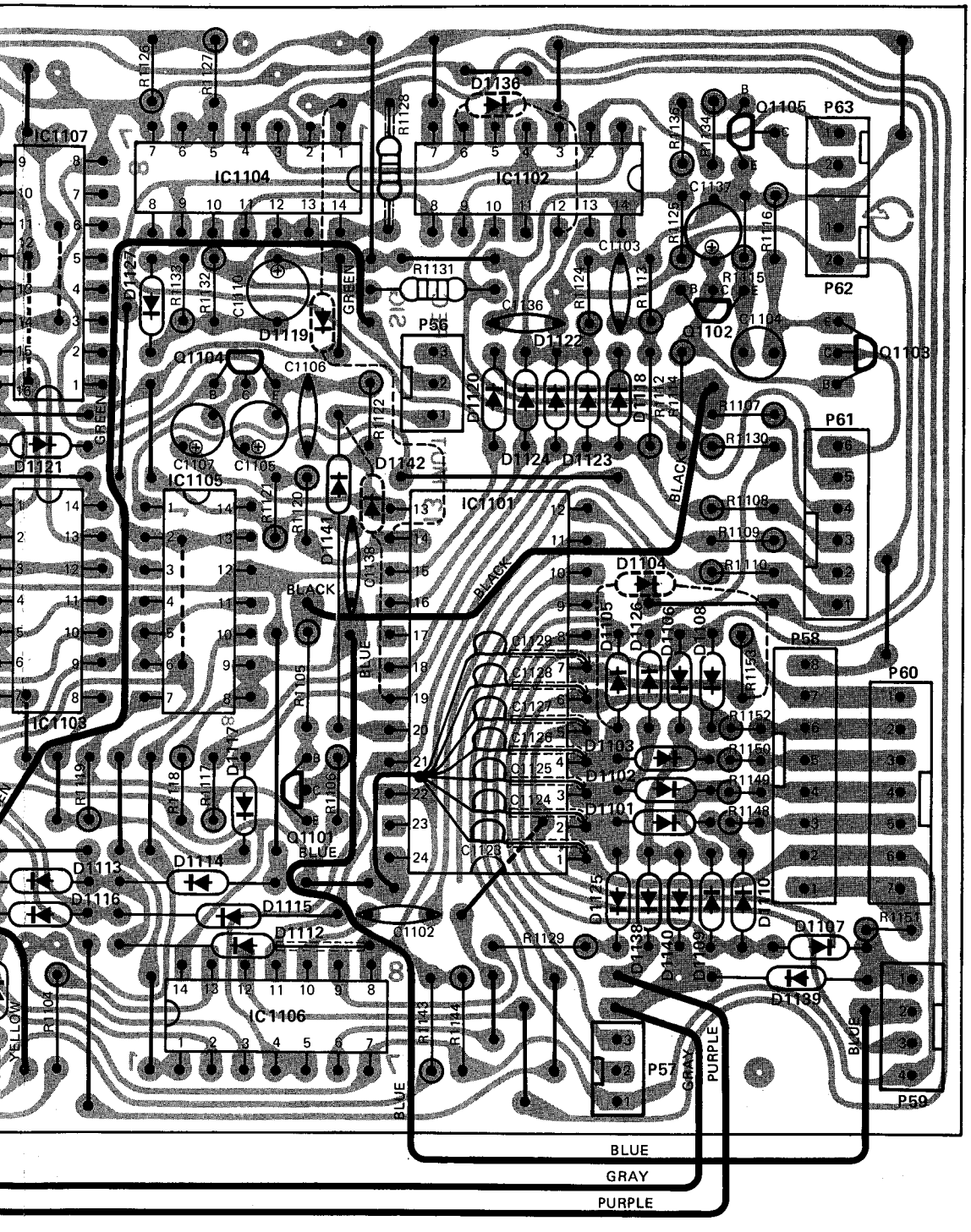
Ref. No.	Part No.	Description
	RESISTORS	
VR703, 704	5101-5017187	Variable Resistor, 500 ohm
	CAPACITORS, ELECTROLYTIC	
C701, 702, 707	5345-106-16	10uF +50%–10% 16V
C703, 704	5345-226C0212	22uF +20%–20% 16V
	INTEGRATED CIRCUITS	
IC701, 702	5652-BA682A	BA682A Peak Level Display Driver
	DIODES	
D203, 505	5637-TLG226	Light Emitting Diode, TLG226 Dolby NR Indicator, Dolby HX Indicator
D441	5637-TLR226	Light Emitting Diode, TLR226 Monitor Indicator
D504	5632-1SR35-10	1SR35-100
D703, 704	5631-1S2473	1S2473
DP701, 702	5623-GL112F9	LED Display, GL112F9 Peak Level

CONTROL P.C. BOARD



CONTROL P.C. BOARD

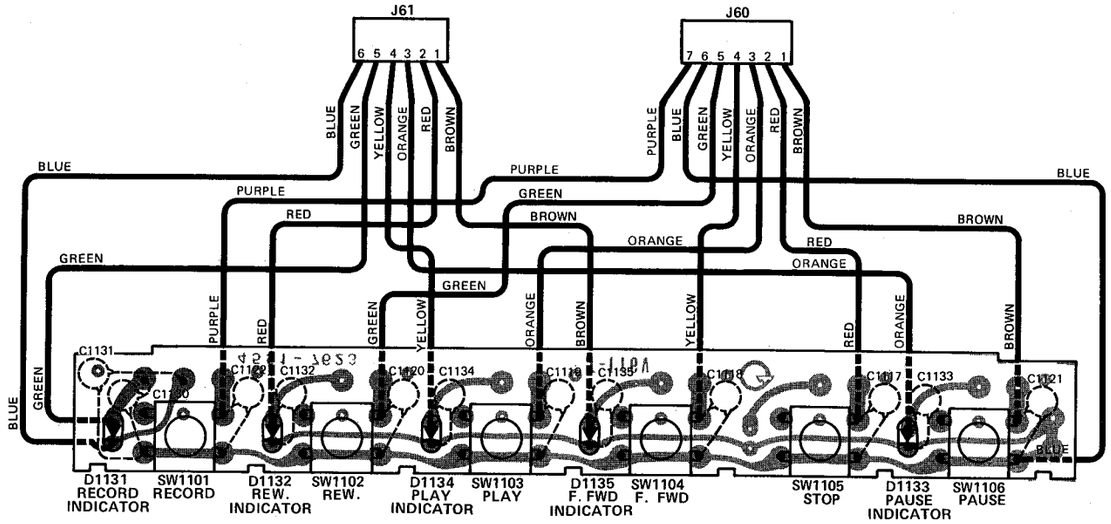



IC1107
IC1104
IC1102
D1136
Q1105
P63
P62
Q1103
P61
P60
P58
P59
P57
P56
IC1101
IC1105
IC1103
IC1106
Q1104
Q1102
Q1101
D1119
D1122
D1124
D1123
D1142
D1104
D1103
D1102
D1101
D1107
D1109
D1114
D1113
D1116
D1115
D1112
C1102
C1103
C1106
C1107
C1105
C1136
C1137
R1131
R1129
GREEN
BLACK
BLUE
YELLOW
GRAY
PURPLE

CONTROL P.C. BOARD

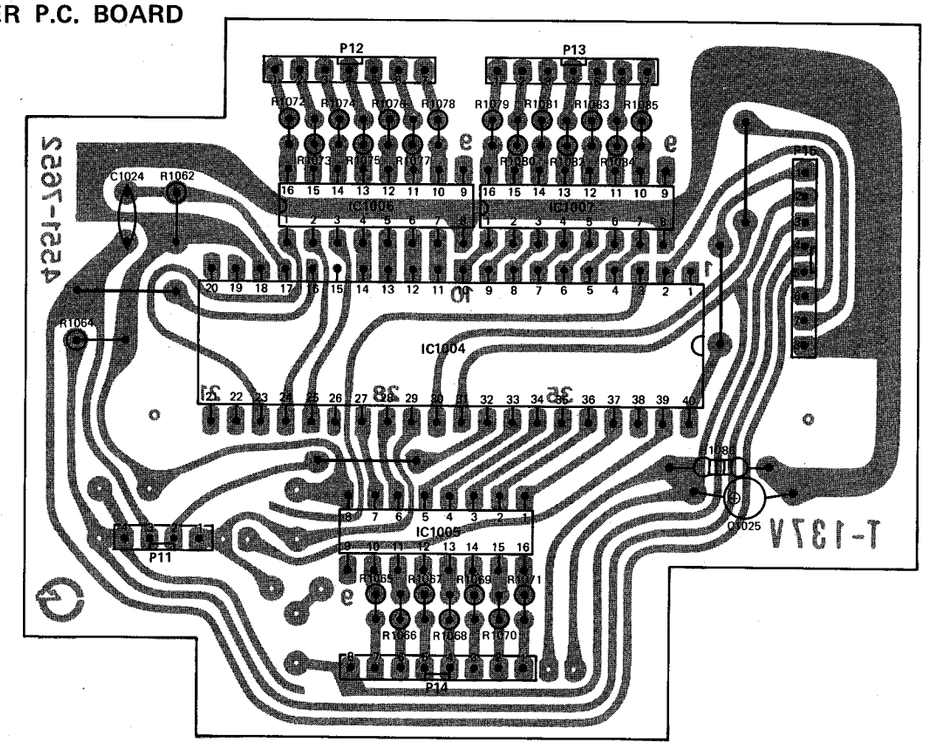
Ref. No.	Part No.	Description
	RESISTORS, FUSE	
R1201	5102-2205114	22 ohm +5%—5% 1/2W
R1204, 1208, 1209, 1230	5102-1004713	10 ohm +2%—2% 1/4W
	CAPACITORS, ELECTROLYTIC	
C1104	5342-226C0951	22uF +20%—20% 16V
C1105, 1108	5345-226-16	22uF +50%—10% 16V
C1107	5345-684F0212	0.68uF +20%—20% 50V
C1110	5345-476C0212	47uF +20%—20% 16V
C1114	5345-224F0212	0.22uF +20%—20% 50V
C1115, 1139, 1204, 1205, 1206, 1207, 1208	5345-106-16	10uF +50%—10% 16V
C1116	5345-105-50	1uF +75%—10% 50V
C1137	5345-474-50	0.47uF +75%—10% 50V
C1202	5345-107C041	100uF +50%—10% 16V
	INTEGRATED CIRCUITS	
IC1101	5654-TC9121P	TC9121P Tape Deck Control
IC1102, 1103	5654-uPD4001C	uPD4001C Electronic Auto Search
IC1104, 1105	5654-uPD4011C	uPD4011C Electronic Auto Search, Inverter/Osc. Time Control
IC1106	5654-uPD4023C	uPD4023C Counter Memory & Auto Play/Rew. Switching
IC1107	5654-uPD4017C	uPD4017C Decade Counter Divider
IC1108	5654-BA335	BA335 Signal Comparator
IC1201	5653-BA6109	BA6109 Reel Motor Control
	TRANSISTORS	
Q1101	5613-2603(F)	2SC2603(F) Auto Play/Rew. Killer
Q1102, 1103	5613-2603(F)	2SC2603(F) Record Indicator Driver
Q1104	5613-2603(F)	2SC2603(F) Osc. Time Control
Q1105	5613-2603(F)	2SC2603(F) Electronic Auto Search Indicator Driver
Q1106	5613-2603(F)	2SC2603(F) Electronic Auto Search Solenoid Driver
Q1107	5611-1115(F)	2SA1115(F) Electronic Auto Search Switching
Q1108	5613-2603(F)	2SC2603(F) Rotation Sensor Amp.
Q1201	5613-1449(K)	2SC1449(K) Voltage Regulator
Q1202, 1203	5613-2603(F)	2SC2603(F) Motor Turning Control
Q1204, 1208	5613-2603(F)	2SC2603(F)
Q1205	5611-1115(F)	2SA1115(F) } Lifter Solenoid Driver
Q1206	5614-863(E)	2SD863(E)
Q1207	5614-355(D)	2SD355(D)or(E)
Q1209	5614-355(D)	2SD355(D)or(E)
Q1211	5613-2603(F)	2SC2603(F) } Brake Solenoid Driver
Q1212	5611-1115(F)	2SA1115(F)
Q1213	5614-863(E)	2SD863(E)
	DIODES	
D1101~1110, 1112~1130, 1136~1143, 1205~1211, 1214	5631-1S2473	1S2473
D1201	5635-EQA0111R	Zener, EQA0111R
D1202	5635-RD3.3EB2	Zener, RD3.3EB2
D1203	5635-EQA0110R	Zener, EQA0110R
D1204	5635-EQA0115R	Zener, EQA0115R
D1212, 1213	5632-1SR35-10	1SR35-100

CASSETTE LED P.C. BOARD



Ref. No.	Part No.	Description
SW1101, 1102, 1103, 1104, 1105, 1106	4431-01017193	Push Switch, Record, Rew., Play, F. FWD, Stop, Pause
D1131	5637-TLR226	Light Emitting Diode, TLR226 Record Indicator
D1132, 1134, 1135	5637-TLG226	Light Emitting Diode, TLG226 Rew., Play and F. FWD Indicators
D1133	5637-TLY226	Light Emitting Diode, TLY226 Pause Indicator

COUNTER P.C. BOARD

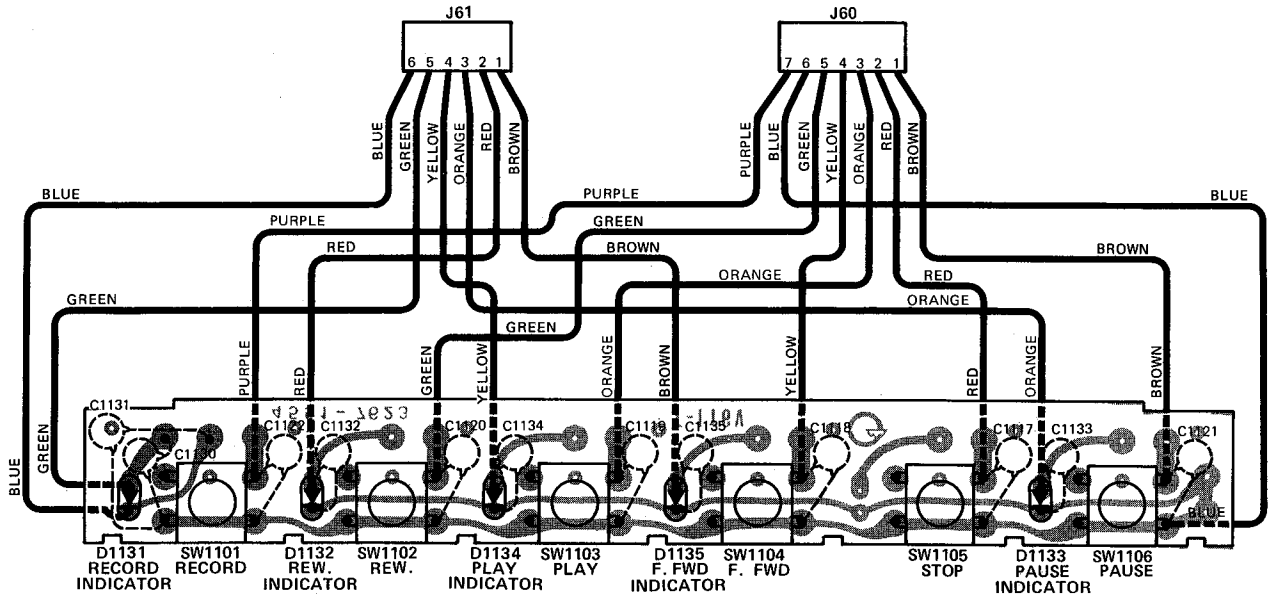


Ref. No.	Part No.	Description
IC1004	5654-TM3140B	Integrated Circuit, TM3140B Counter
IC1005, 1006, 1007	5654-IR2403	Integrated Circuit, IR2403 Digital Counter Driver
C1025	5345-335F0212	Capacitor, 3.3uF +20%—20% 50V Electrolytic

CONTROL P.C. BOARD

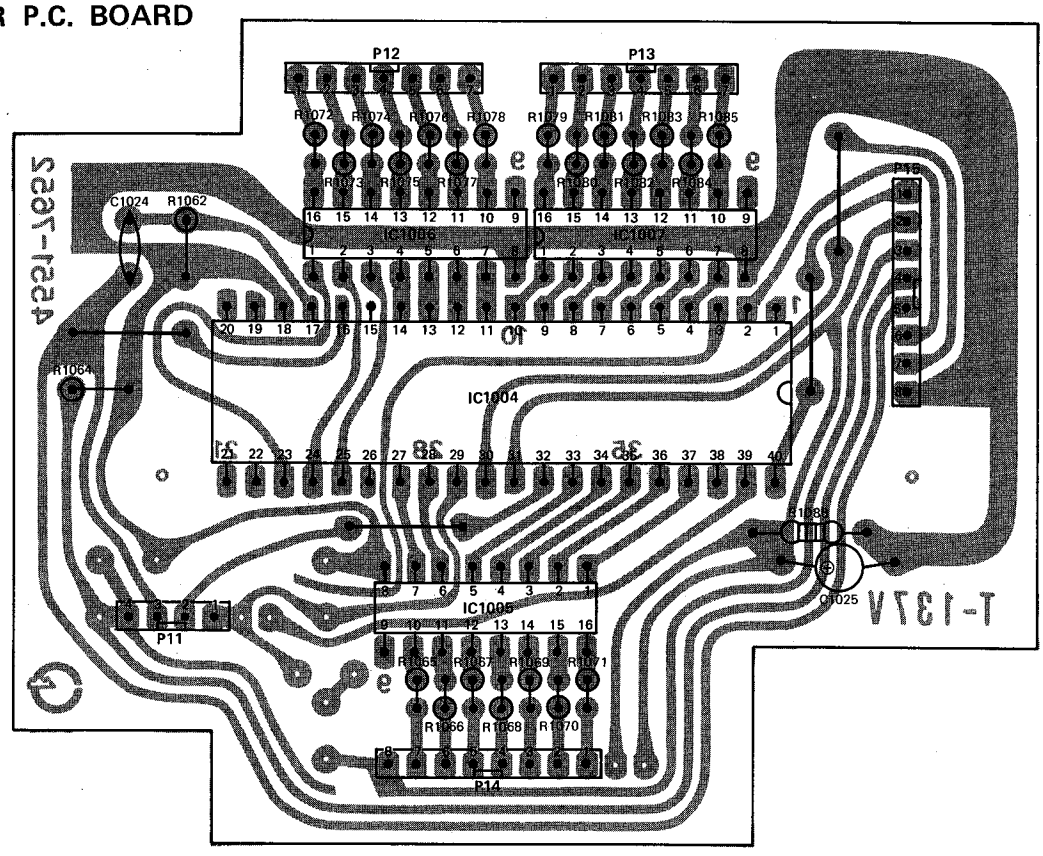
Ref. No.	Part No.	Description
	RESISTORS, FUSE	
R1201	5102-2205114	22 ohm +5%–5% 1/2W
R1204, 1208, 1209, 1230	5102-1004713	10 ohm +2%–2% 1/4W
	CAPACITORS, ELECTROLYTIC	
C1104	5342-226C0951	22uF +20%–20% 16V
C1105, 1108	5345-226-16	22uF +50%–10% 16V
C1107	5345-684F0212	0.68uF +20%–20% 50V
C1110	5345-476C0212	47uF +20%–20% 16V
C1114	5345-224F0212	0.22uF +20%–20% 50V
C1115, 1139, 1204, 1205, 1206, 1207, 1208	5345-106-16	10uF +50%–10% 16V
C1116	5345-105-50	1uF +75%–10% 50V
C1137	5345-474-50	0.47uF +75%–10% 50V
C1202	5345-107C041	100uF +50%–10% 16V
	INTEGRATED CIRCUITS	
IC1101	5654-TC9121P	TC9121P Tape Deck Control
IC1102, 1103	5654-uPD4001C	uPD4001C Electronic Auto Search
IC1104, 1105	5654-uPD4011C	uPD4011C Electronic Auto Search, Inverter/Osc. Time Control
IC1106	5654-uPD4023C	uPD4023C Counter Memory & Auto Play/Rew. Switching
IC1107	5654-uPD4017C	uPD4017C Decade Counter Divider
IC1108	5654-BA335	BA335 Signal Comparator
IC1201	5653-BA6109	BA6109 Reel Motor Control
	TRANSISTORS	
Q1101	5613-2603(F)	2SC2603(F) Auto Play/Rew. Killer
Q1102, 1103	5613-2603(F)	2SC2603(F) Record Indicator Driver
Q1104	5613-2603(F)	2SC2603(F) Osc. Time Control
Q1105	5613-2603(F)	2SC2603(F) Electronic Auto Search Indicator Driver
Q1106	5613-2603(F)	2SC2603(F) Electronic Auto Search Solenoid Driver
Q1107	5611-1115(F)	2SA1115(F) Electronic Auto Search Switching
Q1108	5613-2603(F)	2SC2603(F) Rotation Sensor Amp.
Q1201	5613-1449(K)	2SC1449(K) Voltage Regulator
Q1202, 1203	5613-2603(F)	2SC2603(F) Motor Turning Control
Q1204, 1208	5613-2603(F)	2SC2603(F) } Lifter Solenoid Driver
Q1205	5611-1115(F)	2SA1115(F)
Q1206	5614-863(E)	2SD863(E)
Q1207	5614-355(D)	2SD355(D)or(E)
Q1209	5614-355(D)	2SD355(D)or(E) } Brake Solenoid Driver
Q1211	5613-2603(F)	2SC2603(F)
Q1212	5611-1115(F)	2SA1115(F)
Q1213	5614-863(E)	2SD863(E)
	DIODES	
D1101~1110, 1112~1130, 1136~1143, 1205~1211, 1214	5631-1S2473	1S2473
D1201	5635-EQA0111R	Zener, EQA0111R
D1202	5635-RD3.3EB2	Zener, RD3.3EB2
D1203	5635-EQA0110R	Zener, EQA0110R
D1204	5635-EQA0115R	Zener, EQA0115R
D1212, 1213	5632-1SR35-10	1SR35-100

CASSETTE LED P.C. BOARD



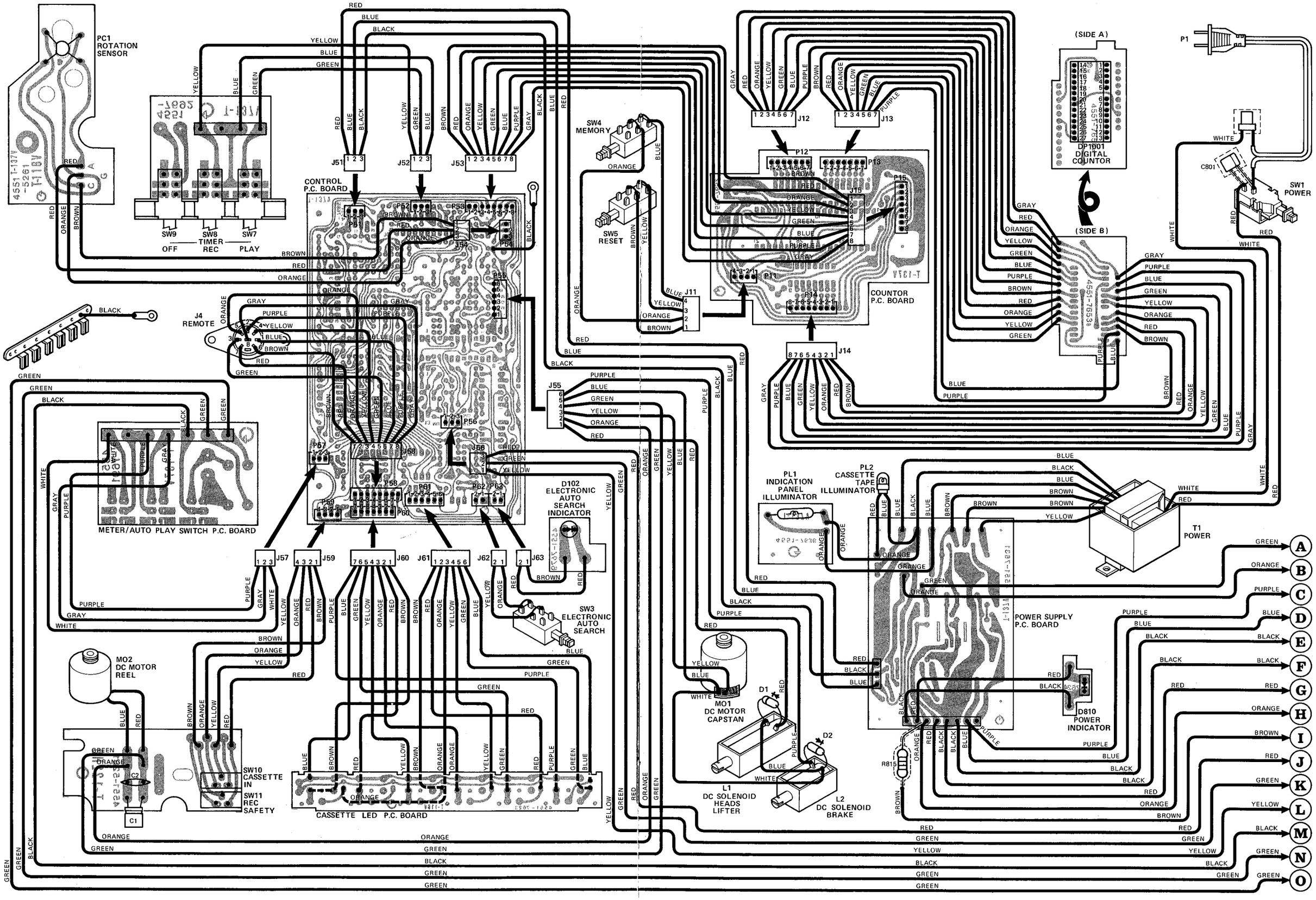
Ref. No.	Part No.	Description
SW1101, 1102, 1103, 1104, 1105, 1106	4431-01017193	Push Switch, Record, Rew., Play, F. FWD, Stop, Pause
D1131	5637-TLR226	Light Emitting Diode, TLR226 Record Indicator
D1132, 1134, 1135	5637-TLG226	Light Emitting Diode, TLG226 Rew., Play and F. FWD Indicators
D1133	5637-TLY226	Light Emitting Diode, TLY226 Pause Indicator

COUNTER P.C. BOARD

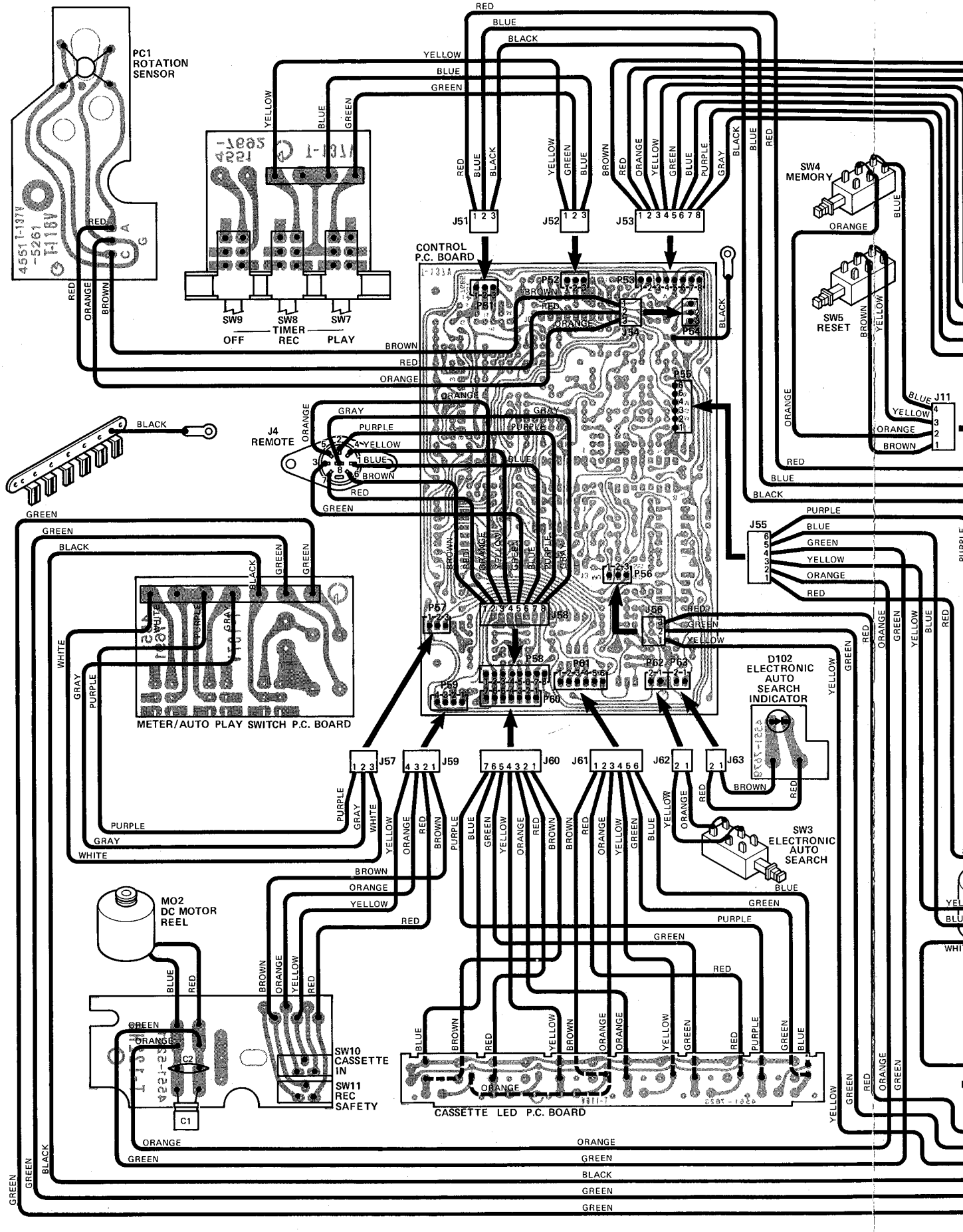


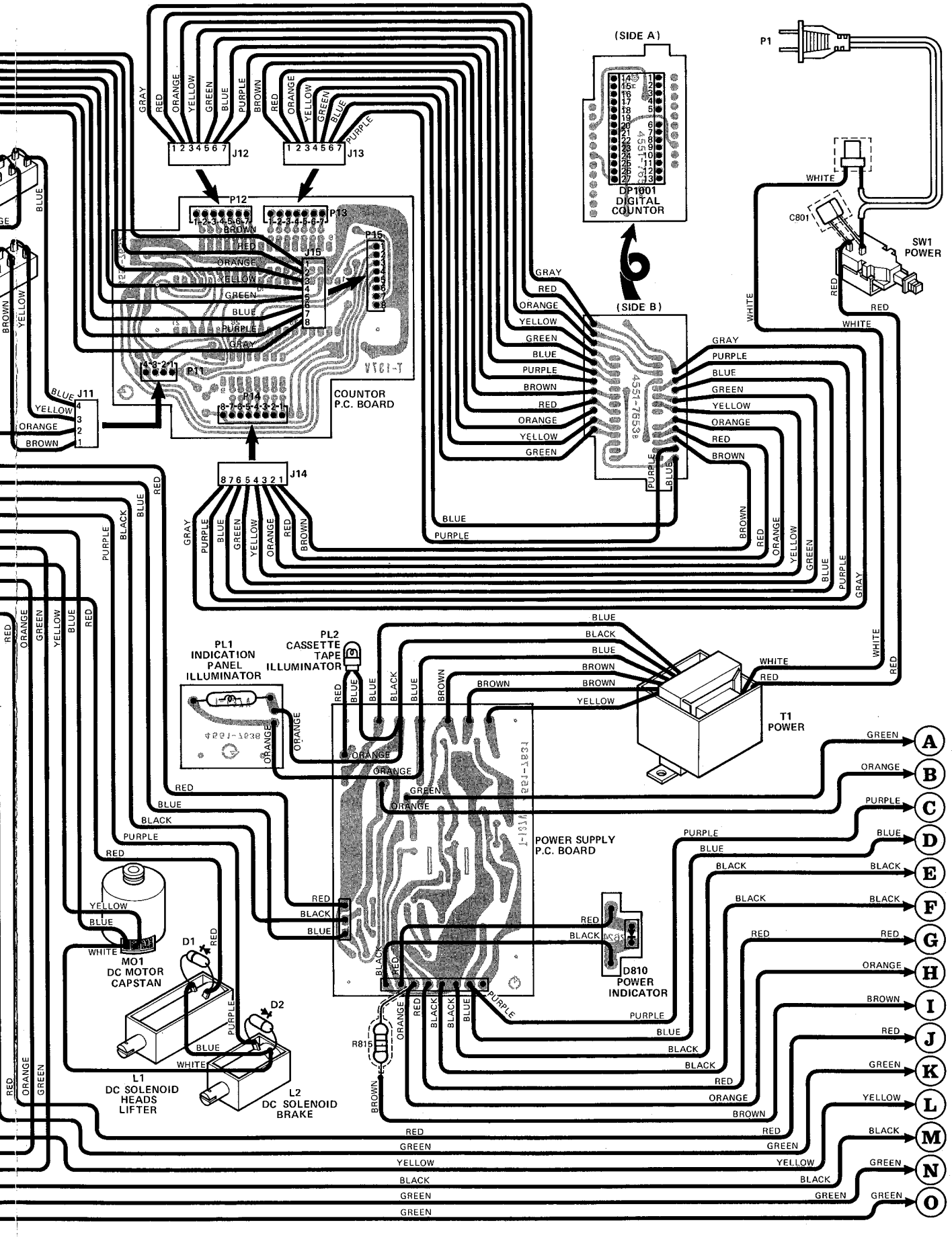
Ref. No.	Part No.	Description
IC1004	5654-TM3140B	Integrated Circuit, TM3140B Counter
IC1005, 1006, 1007	5654-IR2403	Integrated Circuit, IR2403 Digital Counter Driver
C1025	5345-335F0212	Capacitor, 3.3uF +20%—20% 50V Electrolytic

WIRING DIAGRAM

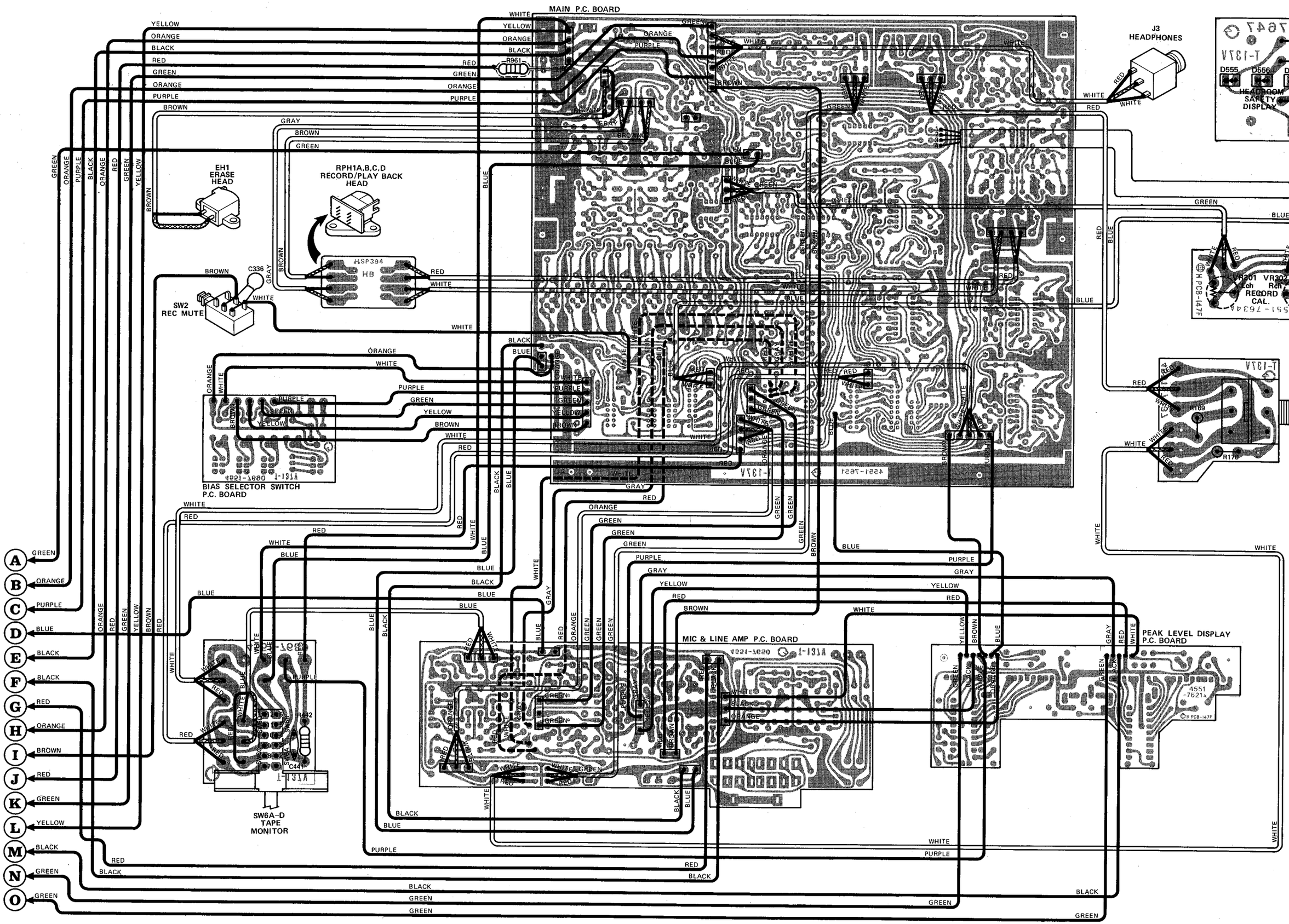


WIRING DIAGRAM

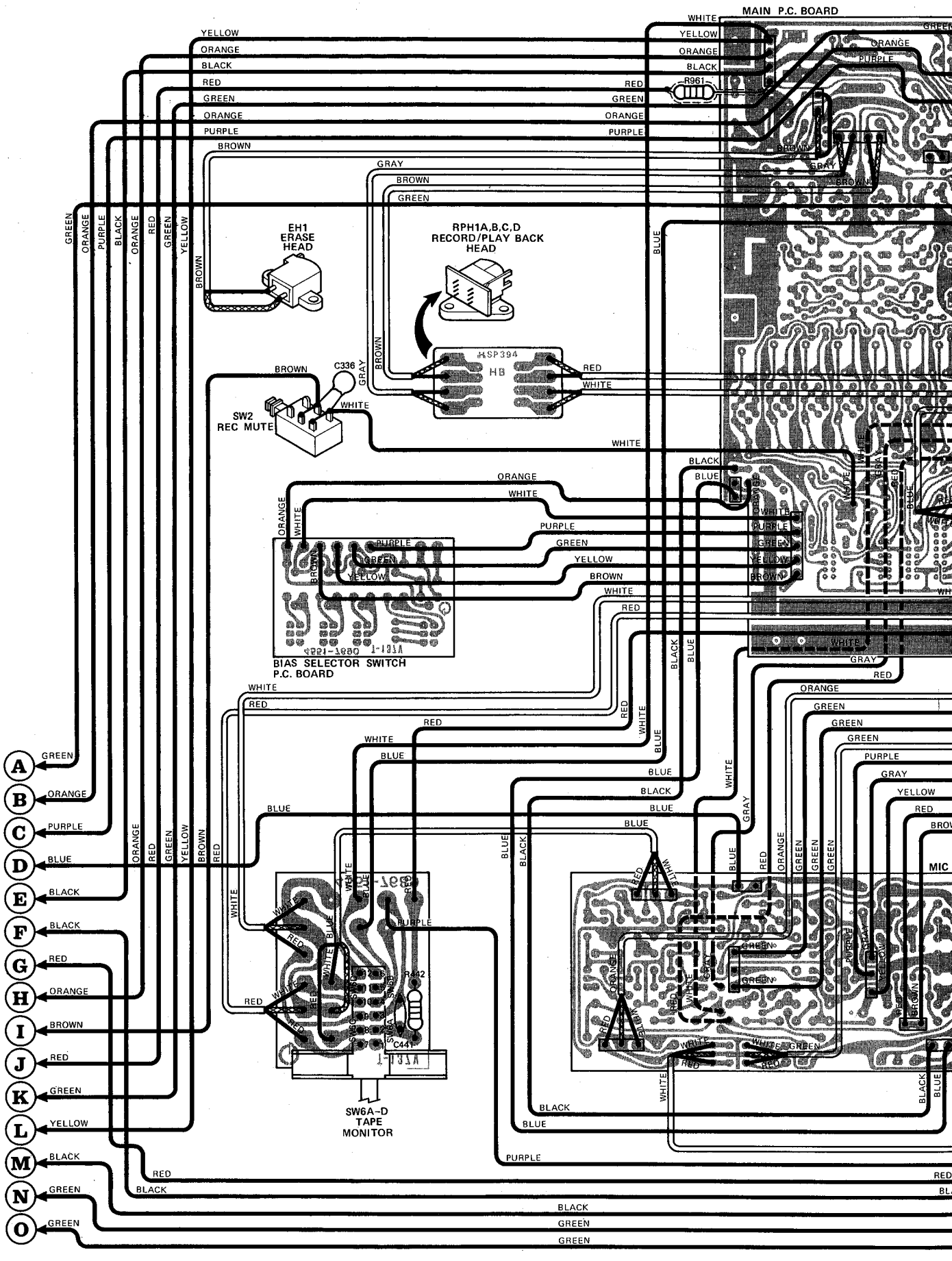


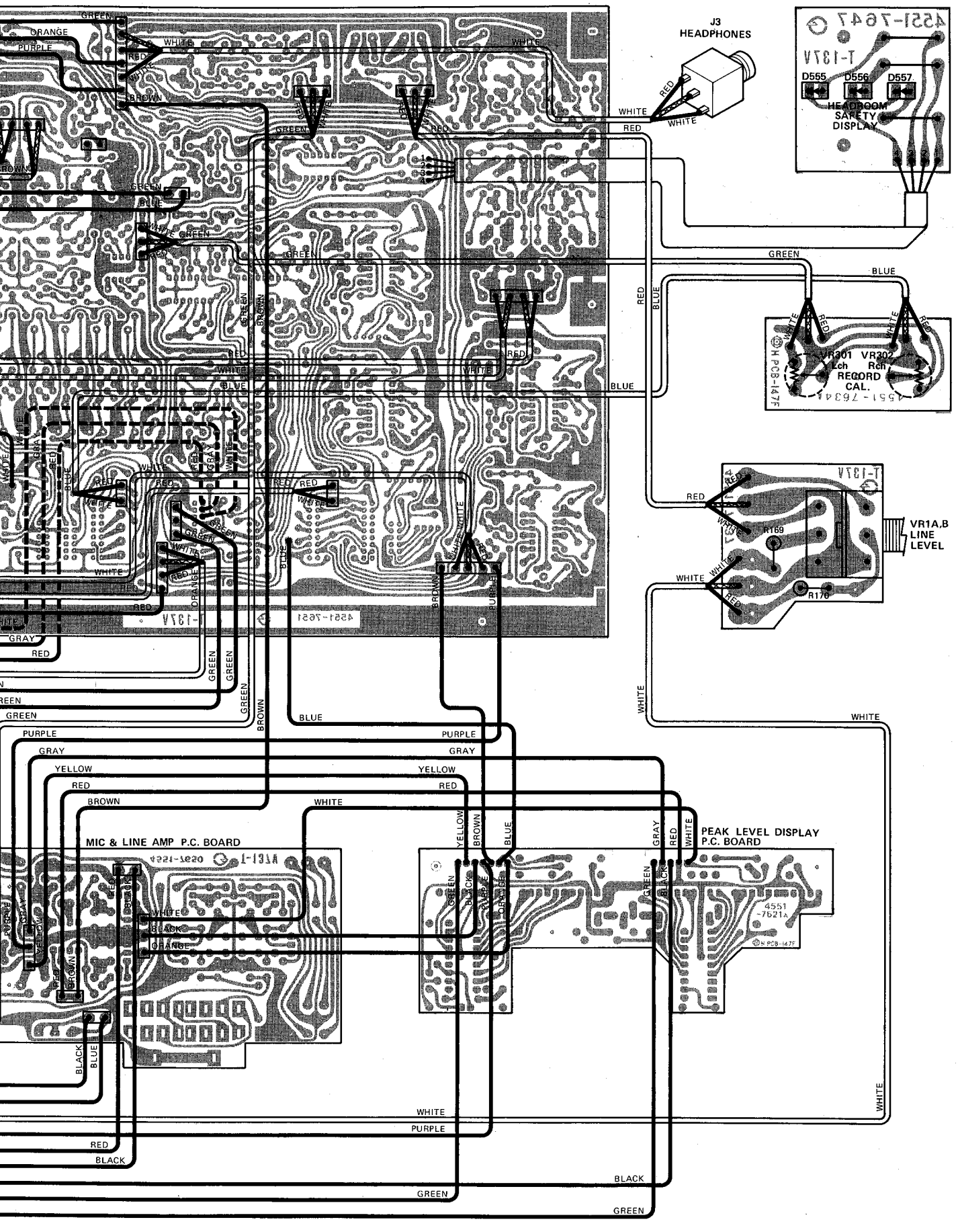

(SIDE A)
(SIDE B)
DP1001
DIGITAL
COUNTOR
P1
SW1
POWER
C801
J12
J13
P12
P13
P15
J15
P11
P14
J11
J14
COUNTOR
P.C. BOARD
PL1
INDICATION
PANEL
ILLUMINATOR
PL2
CASSETTE
TAPE
ILLUMINATOR
T1
POWER
POWER SUPPLY
P.C. BOARD
D810
POWER
INDICATOR
MO1
DC MOTOR
CAPSTAN
D1
D2
L1
DC SOLENOID
HEADS
LIFTER
L2
DC SOLENOID
BRAKE
R815
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O

WIRING DIAGRAM

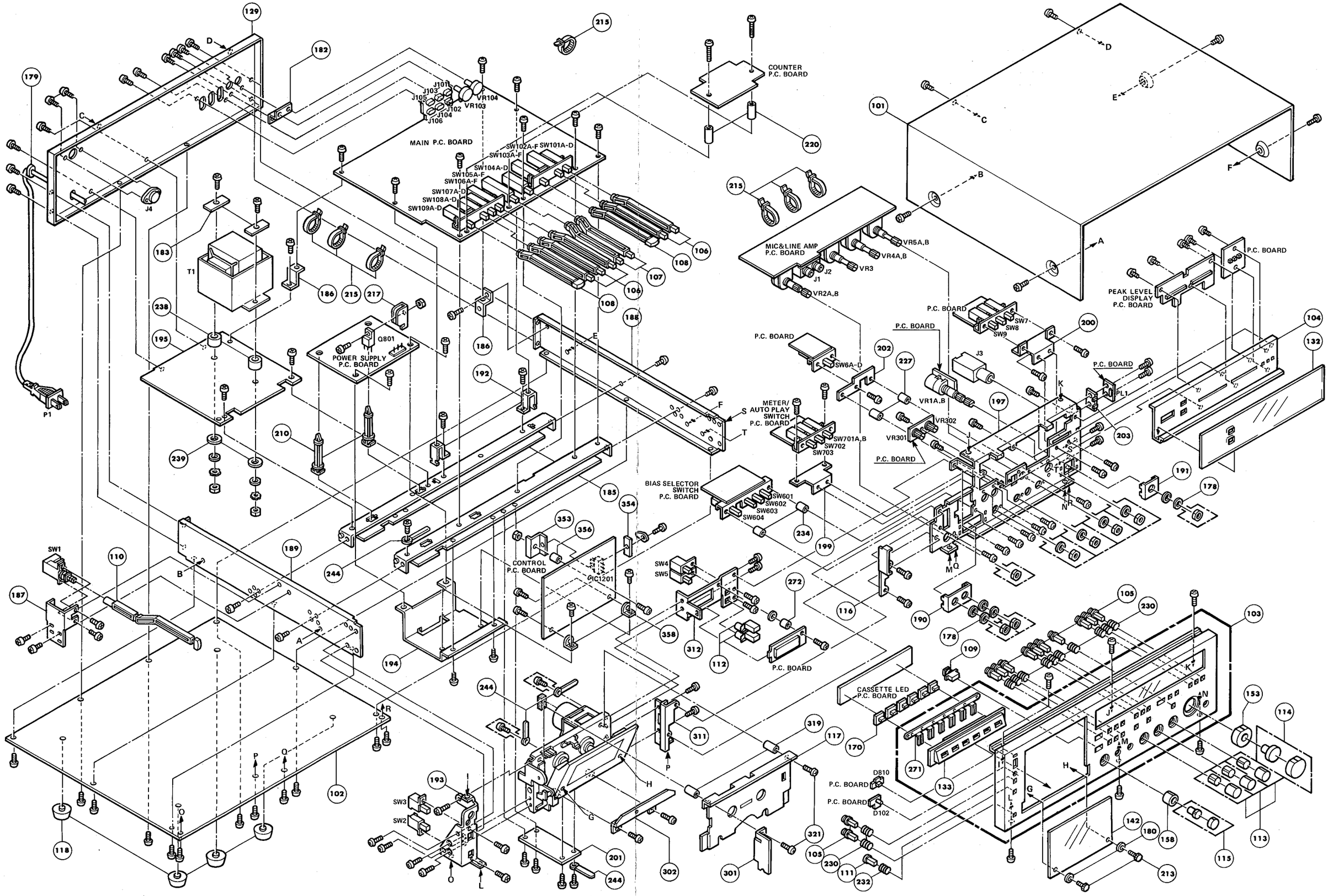


WIRING DIAGRAM

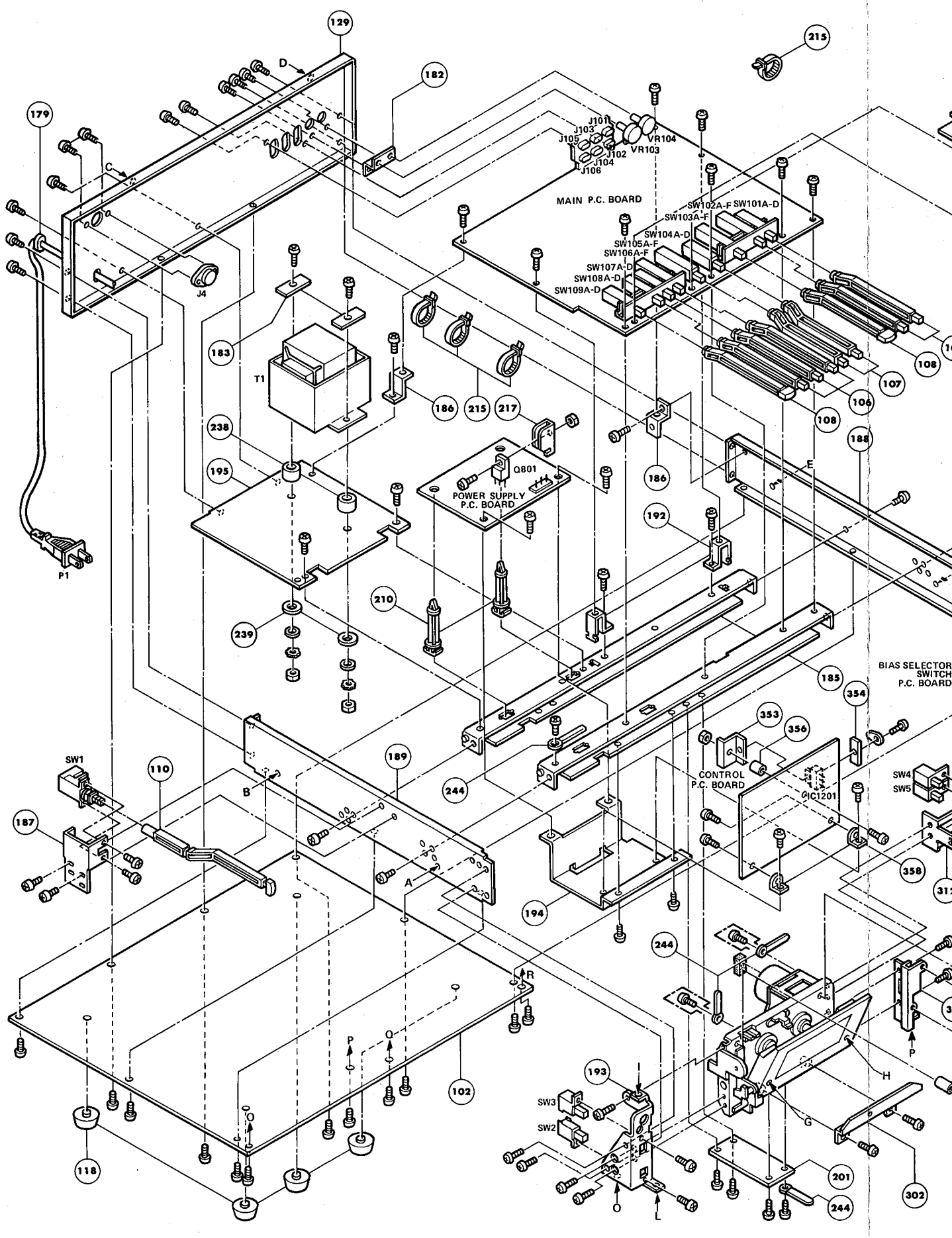


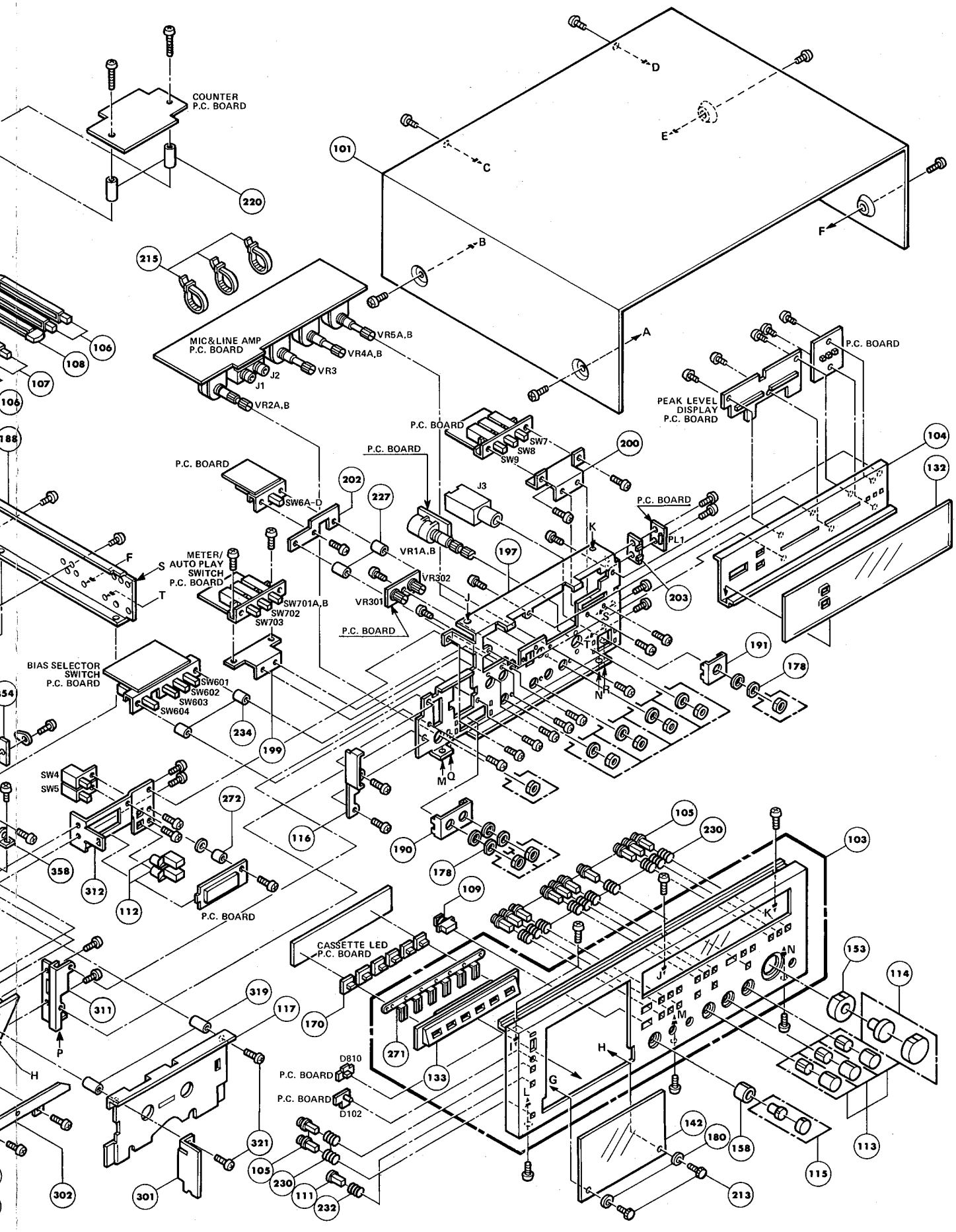

J3
HEADPHONES
D555
D556
D557
HEADROOM
SAFETY
DISPLAY
VR301
Lch
RECORD
CAL.
VR302
Rch
VR1A,B
LINE
LEVEL
R169
R170
MIC & LINE AMP P.C. BOARD
PEAK LEVEL DISPLAY
P.C. BOARD
GREEN
ORANGE
PURPLE
WHITE
RED
BROWN
BLUE
GRAY
YELLOW
BLACK

GENERAL UNIT EXPLODED VIEW

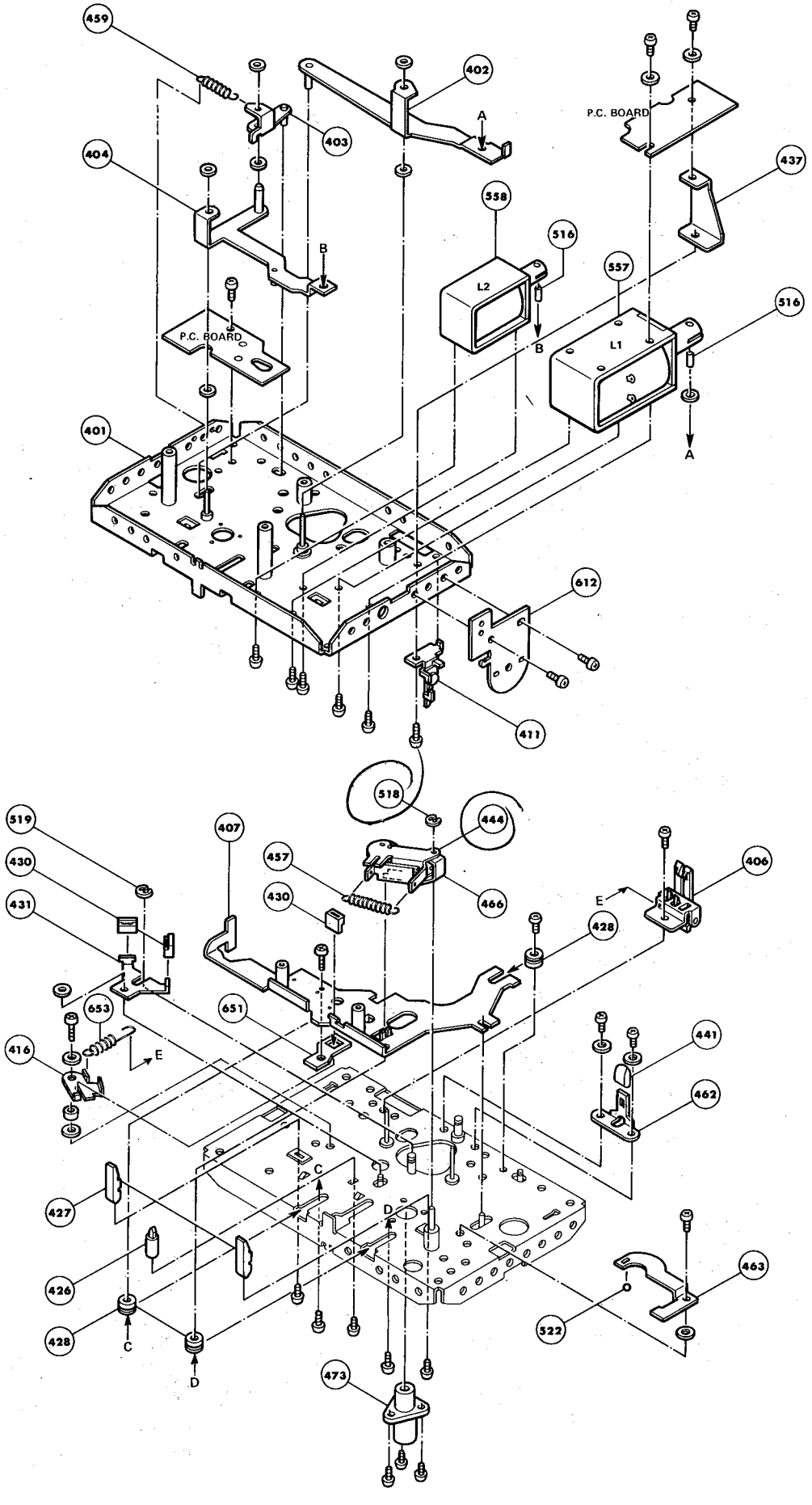


GENERAL UNIT EXPLODED VIEW

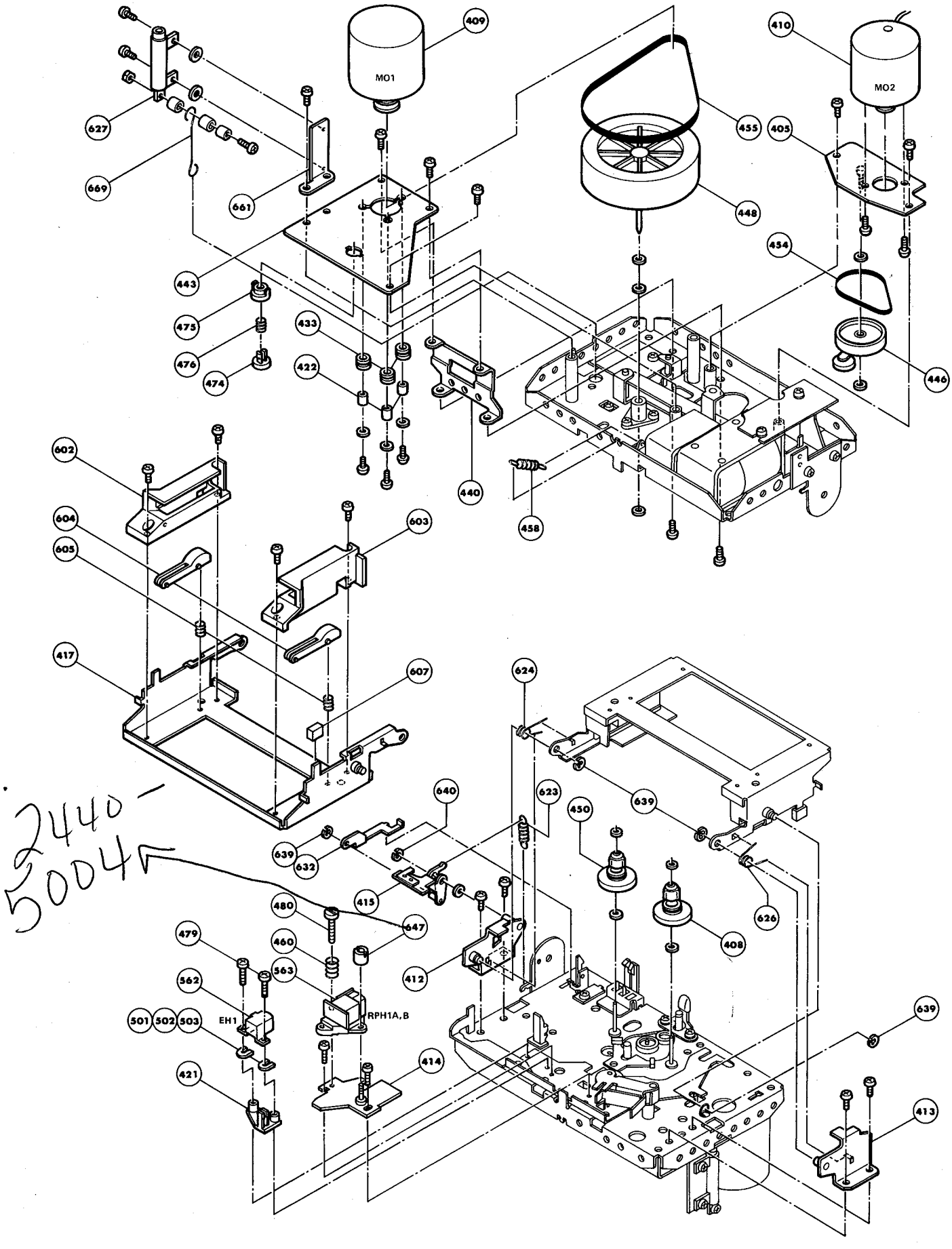



COUNTER P.C. BOARD
220
101
D
C
E
F
B
A
215
MIC&LINE AMP P.C. BOARD
VR5A,B
VR4A,B
VR3
J2
J1
VR2A,B
106
108
107
106
188
P.C. BOARD
SW7
SW8
SW9
200
P.C. BOARD
PEAK LEVEL DISPLAY P.C. BOARD
104
132
P.C. BOARD
SW6A-D
202
227
J3
VR1A,B
197
P.C. BOARD
PL1
203
K
F
S
T
METER/ AUTO PLAY SWITCH P.C. BOARD
SW701A,B
SW702
SW703
VR302
VR301
J
P.C. BOARD
S
T
191
178
N
R
BIAS SELECTOR SWITCH P.C. BOARD
SW601
SW602
SW603
SW604
234
199
M
Q
SW4
SW5
272
116
190
178
105
230
103
358
312
112
P.C. BOARD
109
CASSETTE LED P.C. BOARD
K
N
153
114
319
117
311
170
271
133
M
H
P
H
D810
P.C. BOARD
D102
P.C. BOARD
I
G
L
142
180
158
113
115
321
105
230
111
232
213
302
301

CASSETTE TAPE RECORDER EXPLODED VIEW



CASSETTE TAPE RECORDER EXPLODED VIEW



CHASSIS PARTS LIST

Ref. No.	Part No.	Description
	GENERAL UNIT	
101	A414-HK400	Cabinet Top Assembly
103	A443-HK400	Front Panel Assembly
105	A662-HK400-A	Push Button Assembly, Electronic Auto Search, Rec. Mute, Bias (CrO_2, FeCr, LN), Auto Rewind, Auto Replay, Meter Ballistics, Tape Monitor, Timer
106	A662-HK400-B	Push Button Assembly, Equalization (CrO_2, FeCr, LN), Dolby NR, MPX Filter
107	A662-HK400-C	Push Button Assembly, Bias Tone, Record Cal. Tone
108	A662-HK400-D	Push Button Assembly, Equalization (Metal), Dolby HX
109	A662-HK400-E	Push Button Assembly, Bias (Metal)
110	A662-HK400-F	Push Button Assembly, Power
111	A662-HK400-G	Push Button Assembly, Eject
112	A662-HK400-H	Push Button Assembly, Memory, Reset
113	A634-HK400-A	Knob Assembly, Bias Fine Trim, Output Level, Fader
114	A634-HK400-B	Knob Assembly, L ch. Line Level
115	A634-HK400-C	Knob Assembly, L ch. Microphone Level
117	A514-HK400M	Dressing Plate Assembly
118	1319-0139	Foot
129	1424-04002	Cabinet Back
132	1441-00301	Indication Panel
133	1442-02601	Panel
142	1531-02302	Cassette Compartment Cover
153	1630-01301	Knob, R ch. Line Level
158	1634-02101	Knob, R ch. Microphone Level
170	1662-05901VN	Push Button, Record, Rew., Play, F. FWD, Stop, Pause
	CASSETTE TAPE RECORDER	
406	B219-MR061HFA	Bracket Assembly, Switch Lever
408	B661-MR061HFA	Take-Up Reel Spindle Assembly
409(MO1)	D311-MR061HFA	DC Motor Assembly (w/Pulley), Capstan
410(MO2)	D311-MR061HFB	DC Motor Assembly (w/Pulley), Reel
444	2614-5030	Pinch Roller
446	2662-5020	Clutch
448	2617-5124	Flywheel
450	2661-415032	Supply Reel Spindle
454	2642-02415	Belt
455	2642-02411	Belt
557(L1)	4333-40215	DC Solenoid, Heads Lifter
558(L2)	4333-40414	DC Solenoid, Brake
562(EH1)	5873-1217	Erase Head
563(RPH1A, B)	5874-1322	Record/Playback Head
627	2692-3	Damper
	ELECTRICAL	
P1	4161-0487	AC Line Cord
T1	5584-701314	Power Transformer
SW1	4431-01017358	Push Switch, Power
SW2, 3	4431-01027195	Push Switch, Rec. Mute, Electronic Auto Search
SW4	4431-01027169	Push Switch, Memory
SW5	4431-01027269	Push Switch, Reset
SW6A-D	4431-01047894	Push Switch, Tape Monitor
SW7, 8, 9	4431-03067550	3-Gang Push Switch, Timer
SW10, 11	4463-48	Spring Switch, Cassette In, Rec. Safety
VR1A, B	5113-5037182	Variable Resistor, 50 k ohm Line Level Control
VR301, 302	5101-2230177	Variable Resistor, 22 k ohm Record Calibration Control
C1	5342-226C0951	Capacitor, 22uF +20%–20% 16V Electrolytic
C801	5352-1030959	Capacitor, 0.01uF +20%–20% AC125V Metalized Polyester

CHASSIS PARTS LIST

Ref. No.	Part No.	Description
	ELECTRICAL (continued)	
PC1	5624-GP2S02	Photo-Interrupter, Rotation Sensor
DP1001	5623-SL-1495	Digital Counter
D1, 2	5632-1SR35-10	Diode, 1SR35-100
D102	5637-TLG206	Light Emitting Diode, TLG206 Electronic Auto Search Indicator
D555	5637-GL9NG2	Light Emitting Diode, GL9NG2 (Green) } Headroom Safety Display
D556	5637-GL9HY2	Light Emitting Diode, GL9HY2 (Yellow) } Headroom Safety Display
D557	5637-GL9PR20	Light Emitting Diode, GL9PR20 (Red) } Headroom Safety Display
D810	5637-GL9PR20	Light Emitting Diode, GL9PR20 Power Indicator
PL1	5731-1507245	Lamp, 15V 100mA Indication Panel Illuminator
PL2	5731-1404123	Lamp, 14V 50mA Cassette Tape Illuminator
J3	4451-00108	Jack, Headphones
J4	4474-140	DIN Jack, Remote
	4161-7185	Plug with Cord, RCA

harman/kardon 240 CROSSWAYS PARK WEST, WOODBURY, N.Y. 11797

80. 11. 2200 P-01 1112-H15214 Printed in Japan